FINAL Report

Modeling TDM Effectiveness:

Developing a TDM Effectiveness Estimation Methodology (TEEM) and Case Studies for the SR 520 Corridor

Part of the
Implementing Corridor TDM Programs in the Puget Sound Region Project

APPENDIX D
Case Study Reports

Prepared for

Washington State Department of Transportation

In cooperation with U.S. Department of Transportation – Federal Transit Administration

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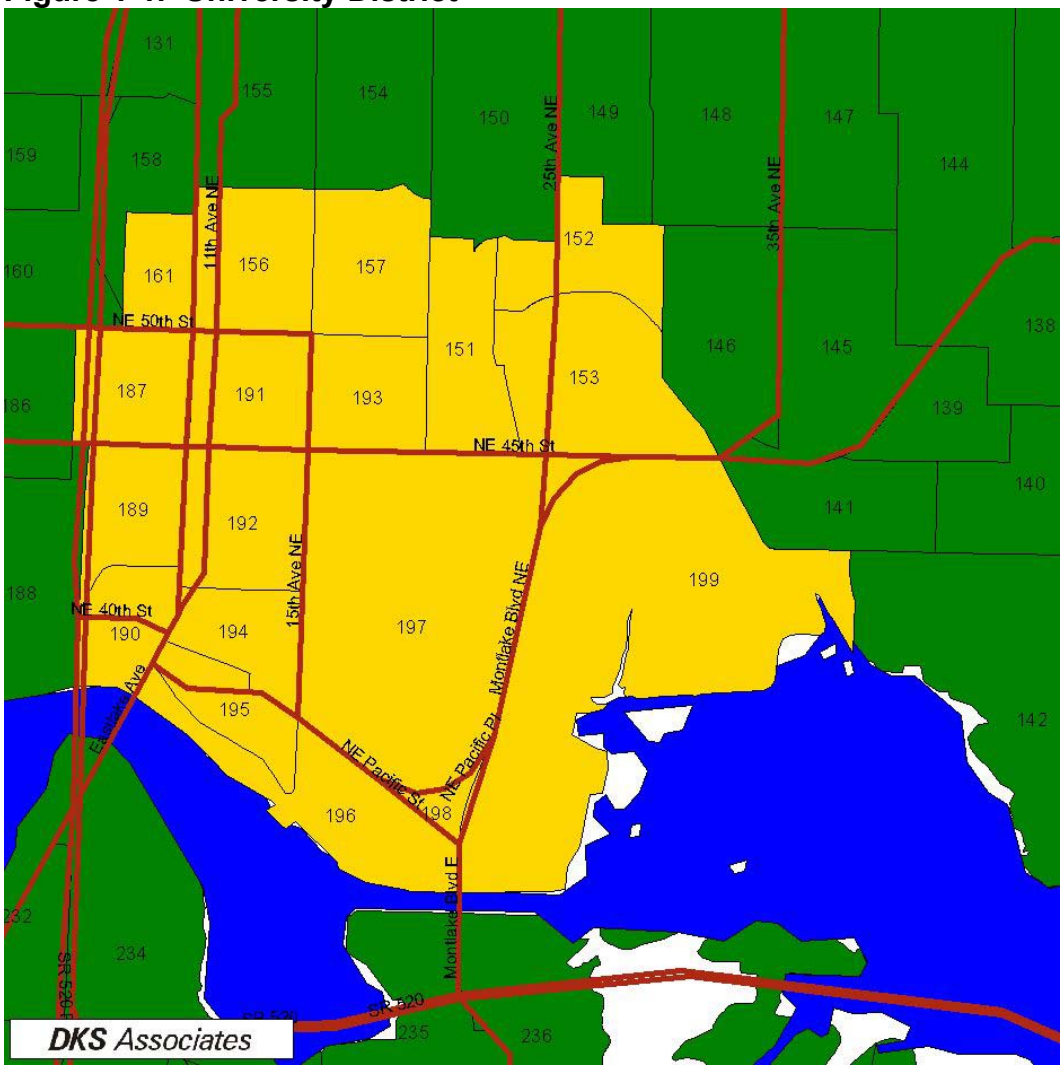
University District

1.0 Setting and Physical Characteristics

1.1 Location

The University District is located in north Seattle; it contains the campus of the University of Washington. The study area boundaries are similar to the area's regionally designated Urban Center boundary. It is bordered to the south by Union Bay and Portage Bay and to the west by I-5. The eastern border is defined by the eastern edge of campus, Union Bay Place NE, and 30th Avenue NE. The northern border of this district follows this path from west to east: NE 55th Street, then north along Roosevelt Way to NE 56th Street to NE Ravenna Boulevard, south along 21st Avenue NE to NE 54th Street, then north along 25th Avenue NE to NE 57th Street, south along 27th Avenue NE to NE 55th Street. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. University District



1.2 Land Use Character and Mix

The four counties of the Central Puget Sound Region contain 21 designated Urban Centers that are focal points for jobs, housing, and culture. Five of these 21 Urban Centers are in the City of Seattle, and one is the University Community Urban Center, also known as the University District. The University District contains within it two Urban Villages as designated by the City of Seattle: The University District NW Urban Village and the Ravenna Urban Village. In the City of Seattle's Comprehensive Plan, Urban Villages are primary locations of future residential and employment growth.

1.3 Access to Freeways and State Facilities

One state route (a surface road), SR 513, runs through the case study area. Two other freeways are nearby, I-5 and SR 520.

SR 513. This road follows Montlake Boulevard NE from SR 520 to NE 45th Street, where it then follows to the right along NE 45th Street. It turns to the left in order to follow Sand Point Way NE out of the study area. This roadway is useful for travelers both entering and leaving the study area.

I-5. This interstate highway runs just west of the study area and follows in the north-south direction from Canada down to Mexico. Locally, it runs from the northern King County, through downtown Seattle, to southern King County. For travelers to/from the University District, it provides for a wide range of destinations. Access to this freeway is provided from a mixture of 45th Street NE and 50th Street NE depending on the direction of the traveler.

SR 520. This highway is just south of the study area and provides access to the Bellevue, Kirkland, and Redmond areas, as well as other parts of eastern King County.

1.4 Roadway Network

The major gateways into the University District are the Montlake and University Bridges to the south, NE Pacific Street and North 45th Street from the west, 28th Avenue NE and Ravenna Boulevard from the north, and Sandpoint Way NE from the East.

1.5 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.5.1 Existing Transit Service

Route 7 services University District, Capitol Hill, Broadway, Downtown Seattle, International District, Rainier Valley, Columbia City, and Rainier Beach. This route operates seven days a week and has an AM peak hour headway of 9 minutes.

Route 9 services University District, Capitol Hill, Broadway, First Hill, Rainier Valley, Columbia City, and Rainier Beach. This route operates seven days a week and has an AM peak hour headway of 30 minutes.

Route 25 services Downtown Seattle, Eastlake, Montlake, the University Village, Children's Hospital, and Laurelhurst. This route only operates on weekdays and has an AM peak hour headway of 20 minutes.

Route 43 services Downtown Seattle, Capitol Hill, Group Health Hospital, Montlake, the UW Campus, and the University District. This route operates seven days a week and has an AM peak hour headway of 12 minutes.

Route 44 services Government Locks, Ballard, Wallingford, the University District, the UW Campus, and Montlake. This route operates seven days a week and has an AM peak hour headway of 10 minutes.

Route 48 services Loyal Heights, Crown Hill, Greenwood, Ravenna, the University District, Montlake, Central District, Columbia City, and Rainier Beach. This route operates seven days a week and has an AM peak hour headway of 8 minutes.

Route 64 services Downtown Seattle, the Green Lake Park and Ride, Ravenna, Wedgwood, and Lake City. This route operates on weekdays and has an AM peak hour headway of 15 minutes.

Route 65 services the University District, UW Campus, University Village, Ravenna, Wedgwood, and Lake City. This route operates seven days a week and has an AM peak hour headway of 15 minutes.

Route 66 services the Coleman Dock-Ferry Terminal, Downtown Seattle, Eastlake, the University District, Maple Leaf, the Northgate Transit Center, Northgate Mall, and the Northgate Park and Ride. This route operates seven days a week and has an AM peak hour headway of 20 minutes.

Route 67 services UW Campus, the University District, Maple Leaf, the Northgate Transit Center, and the Northgate Mall, Northgate Park and Ride. This route operates seven days a week and has an AM peak hour headway of 15 minutes.

Route 70 services Downtown Seattle, Fairview Ave N, Eastlake, and the University District. This route operates on weekdays and Saturdays with an AM peak hour headway of 12 minutes.

Route 71 services Downtown Seattle (Tunnel), Eastlake, the University District, Ravenna, View Ridge, and Wedgwood. This route operates seven days a week and has an AM peak hour headway of 12 minutes.

Route 72 services Downtown Seattle (Tunnel), Eastlake, the University District, Maple Leaf, and Lake City. This route operates seven days a week.

Route 73 services Downtown Seattle (Tunnel), Eastlake, the University District, the Green Lake Park and Ride, Maple Leaf, and Jackson Park. This route operates seven days a week and has an AM peak hour headway of 12 minutes.

Route 74 services Downtown Seattle (peak hours only), the Seattle Center, Fremont, Wallingford, the University District, Ravenna, Sand Point, and NOAA. This route operates seven days a week.

Route 75 services the University of Washington, Sand Point, Lake City, Northgate Mall, the Northgate Transit Center, North Seattle Community College, Crown Hill, and Ballard. This route operates seven days a week and has an AM peak hour headway of 12 minutes.

Route 197 services the University District, the Kent-Des Moines Freeway Station, the Star Lake Freeway Station, the Federal Way Transit Center, the Sea-Tac Mall, and the South Federal Way Park and Ride. This route operates on weekdays and has an AM peak hour headway of 15 minutes.

Route 271 serves the Issaquah Park and Ride, Eastgate, the Eastgate Park and Ride, Bellevue Community College, the Bellevue Transit Center, and the University District. The weekday and Saturday headway is 30 minutes and the Sunday headway is 60 minutes.

Route 355 services Downtown Seattle, the University District, Greenwood, and the Shoreline Community College. This route operates on weekdays and has an AM peak hour headway of 12 minutes.

Route 372 services the University District, the University Village, Ravenna, Wedgewood, Lake City, Lake Forest Park, the Northshore Park and Ride, the Kenmore Park and Ride, the Bothell Park and Ride, and the Woodinville Park and Ride. This route operates on weekdays and has an AM peak hour headway of 15 minutes.

Route 855 is an external link, servicing the Lynnwood Park and Ride, the University District, and the UW Campus. This route operates on weekdays and has an AM peak hour headway of 15 minutes.

1.5.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

In the future, a rail line is expected to serve the University District. The rail line, along with a large number of additional high frequency bus routes, will mean a substantial increase in transit service to the area.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			3	74	**77**
	2030	1		25	19	**45**
Mid-Day	2000			1	69	**70**
	2030	1		12	18	**31**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			13	117	**131**
	2030	12		146	41	**199**
Mid-Day	2000			4	104	**108**
	2030	8		56	46	**110**

1.6 Parking Supply, Availability and Price

The Seattle Comprehensive Neighborhood Parking Study lists both the parking supply and utilization for parts of the University District study area as shown in Table 1-3. This study did not cover the entire study area, but rather, just three parts of the study area: the University District, Greek Row, and the West Residential area.

Table 1-3. On-Street and Off-Street Parking Supply and Utilization

		University Way	Greek Row	West Residential
Parking Supply				
	On-Street	323	452	240
	Off-Street	1,280	1,191	1,573
	Loading	77	49	14
	Total:	**1,680**	**1,692**	**1,827**
Average Parking Usage				
	On-Street	57%	93%	77%
	Off-Street	47%	32%	60%
	Total:	**49%**	**49%**	**63%**
Peak Hour Parking Usage				
	On-Street	70%	96%	83%
	Off-Street	64%	36%	72%
	Total:	**63%**	**53%**	**73%**
Source: Comprehensive Neighborhood Parking Study, August 2000				

The parking data shown in Table 1-3 is only for parts of the University District.[1] Based on this information, and data available from the Seattle travel demand model, parking for the rest of the study area was estimated. The parking supply and demand for the entire case study area that was used within the TEEM model is shown in Table 1-4.

In the University District, University of Washington parking data is available from the UW's Transportation Office. The University District Parking Associates (UDPA) is a parking operator for the U-District businesses/neighborhood and they charge for the surface parking lots that they manage (about 2300 spaces in a 1997 study). Safeco Insurance, another large employer in the study area, also has paid parking.

[1](a) The Puget Sound Regional Council conducted parking studies in downtown Bellevue and Seattle in 1999 and published the results in Parking Inventory for Seattle and Bellevue, 1999, (May 2000). This report was used to compile information for Downtown Bellevue, and portions of Wallingford and South Lake Union.
(b) The City of Seattle Strategic Planning Office conducted neighborhood parking surveys in Comprehensive Neighborhood Parking Study—Final Report (August 2002). The report included much of the on-street and off-street parking in the University District, Wallingford and South Lake Union. The report was used to generate numbers for this analysis. In addition, Mirai Associates counted the few locations not included by the City of Seattle survey to obtain a full count of the specified study areas.
(c) University Community Urban Center Plan: Existing Transportation Conditions and Recommended Transportation Projects, (September 1998), Transportation Solutions, Inc. and Rolfe Kellor Associates. This report was used for the majority of non-University parking in the University District.
(d) The University of Washington Transportation Office provided parking inventory and utilization information for the University of Washington parking lots.

Table 1-4. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	3,335	1,576	12,712	**17,623**
2000 Demand	1,629	1,008	10,542	**13,179**
2000 D/S Ratio	0.49	0.64	0.83	**0.75**
2030 Supply				**20,439**
2030 Demand				**13,845**
2030 D/S Ratio				**0.68**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the application of the model, parking costs are lowered for many users to reflect the many users that don't pay the full price of parking. In the application of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-5.

Table 1-5. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$3.79	$9.21
Carpool	$1.52	$3.68
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

Outside of the University of Washington, the University District study area was designed in a grid format, allowing for good pedestrian access to the nearby amenities. The sidewalk network within the study is almost totally complete.

There are several bike trails, bike lanes and arterial streets that are commonly used by bicyclists in the University District. The main east-to-west trail is the Burke-Gilman Trail that heads through the center of the campus and connects up with the University Bridge and neighborhoods to the west and the Montlake Bridge. Portions of Walla Walla Road NE and NE Canal Road (which run through the University of Washington Campus) also have a bike trail. In addition, Sandpoint Way NE, 17th Avenue NE and Brooklyn Avenue NE are arterial streets that are commonly used by bicyclists.[2] Bike lanes are also located on Ravenna Boulevard, N. 40th Street, and Brooklyn Avenue.

There are several pedestrian/cyclist barriers in the University District, most of which occur when entering or leaving the study area. The lack of nonmotorized access across SR 520 is a significant barrier for those who are traveling to the east side of Lake Washington. All of King County Metro's buses are equipped for carrying bicycles, so cyclists can get across the bridge – however, there is a two bike per bus maximum and during peak hours in the summers the wait to get a bike on the bus can be quite long.

[2] *Seattle Bicycling Guide Map, Seattle Transportation*, Bicycling and Pedestrian Program, Summer 2000

In addition, there are many high-traffic streets in the area (caused, in part, by traffic backups and access onto 520 and I-5) – NE Pacific, Montlake Blvd., Sand Point Way, and 45th Street. I-5 also forms a partial barrier to the west of the study area, forcing cyclists/pedestrians either to cross underneath the freeway at 40th street/NE Pacific or over it at 45th Street.

2.0 Population and Employment Characteristics

Population and employment data for the University District are discussed below.

2.1 Population

The population of the University District is expect to increase by nearly 6000 people over the next thirty years (See Table 2-1).

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	1.72	
Population	19,222	25,507

2.2 Employment

The total employment and the mix of employment are expected to remain relatively constant over the next thirty years. The employment forecast for the area includes almost one thousand new employees. These additional employees are fairly well distributed by both employment type and size of employer, with more "office" type employment and a few less "other" employees (University Employees are defined as "Other"). (See Table 2-2 and Table 2-3).

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	3,850	4,705
Office	5,814	7,230
Other	25,253	23,860
Total	**34,917**	**35,796**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	5,291	1,607	155	27,864	34,917
2030	5,424	1,647	159	28,565	35,796

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the University District. Transit Service is already high throughout the area, and is forecast to become even better over

the next thirty years. In general, the mix of uses in the area is forecast to become slightly lower, while density is expected to increase in many of the zones.

Table 2-6 gives the population, employment and trips by local area TAZ for the University District. These characteristics were described in earlier sections.

Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
151	High 2	High 1	Medium	Medium	Medium	High
152	Medium 2	Medium 2	Medium	Medium	Medium	Medium
153	High 2	High 1	Medium	Medium	Medium	High
156	High 2	High 1	Medium	Medium	High	High
157	High 2	High 1	Medium	Medium	Low	Low
161	High 2	High 1	High	Medium	Low	Low
187	High 2	High 1	High	High	Medium	High
189	High 2	High 1	High	High	Medium	High
190	High 2	High 1	High	High	Low	Medium
191	High 2	High 1	High	High	High	High
192	High 2	High 1	High	High	High	High
193	High 2	High 1	High	Medium	Low	High
194	High 2	High 1	High	Medium	Medium	High
195	High 2	High 1	Medium	Low	Medium	Low
196	High 2	High 1	Low	Low	Low	Low
197	High 2	High 1	Low	Medium	Low	Low
198	High 2	High 1	Low	Low	High	High
199	High 2	High 1	Low	Low	Low	Low

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
151	0.075	2,165	3,014	0	0	65	92	1,223	1,947	135	170
152	0.067	1,352	1,495	202	181	204	315	764	966	538	518
153	0.125	882	1,344	772	1,553	373	493	498	868	1,436	2,838
156	0.080	2,322	2,958	129	227	322	327	1,854	2,888	569	1,222
157	0.080	1,168	1,201	0	0	54	68	932	1,172	94	160
161	0.039	389	446	25	39	132	47	337	487	179	499
187	0.064	792	1,313	115	200	329	700	672	1,168	585	1,531
189	0.058	1,847	2,583	101	185	109	203	1,566	2,298	347	957
190	0.049	425	1,002	34	55	125	217	360	892	217	571
191	0.064	1,274	2,109	919	1,023	903	922	693	1,248	2,266	4,501
192	0.081	3,694	3,467	1,095	1,000	3,043	3,856	2,010	2,052	4,983	8,318
193	0.063	762	2,107	2	2	187	214	415	1,247	237	503
194	0.051	1,314	2,372	47	59	62	44	210	1,373	571	803
195	0.044	739	33	162	0	6	6	118	19	618	752
196	0.098	97	65	50	30	307	127	16	37	2,607	3,665
197	0.332	0	0	96	34	51	166	0	0	40,700	36,397
198	0.011	0	0	7	0	24,748	23,274	0	0	49,881	69,314
199	0.388	0	0	94	118	47	21	0	0	1,053	348

Table 2-7. Population Employment by Transit Service

		Transit Service Level						
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	Total
Transit Service (# of zones)	2000	0	17	0	1	0	0	18
	2030	17	0	0	1	0	0	18
Population	2000	0	17,870	0	1,352	0	0	19,222
	2030	24,013	0	0	1,495	0	0	25,507
Total Employment	2000	0	34,511	0	406	0	0	34,917
	2030	35,300	0	0	496	0	0	35,796

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. Although the area is expected to see almost 40,000 additional daily employee trips, the number of vehicle trips is expected to decrease by more than 4,000 trips. This is most likely attributable to the high level of transit service that is forecast for the base scenario, as well as the fact that the University of Washington (the area's major employer) is affected by the City of Seattle's Major Institutions Ordinance, which limits the number of vehicle trips that the University can bring into the area. This constraint has lead to very aggressive and effective TDM measures at the University of Washington.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	107,016	133,066	58,090	55,660
Employed Residents	11,666	18,661	7,749	8,614

3.2 Vehicle Miles Traveled

The average vehicle miles traveled to work by University District employees is illustrated in Table 3-2. As one would expect, the vanpool users traveled much farther than the other modes, with drive alone and transit users traveling about the same distance.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	11
Carpool	14
Vanpool	25
Transit	12
Non-Motorized	0

3.3 SR 520 Corridor Trips

Almost 5 percent of the PM peak period vehicle trips to and from the University District cross the SR 520 bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering the University District use the bridge, although trips leaving the study area contribute a higher total number of vehicles (i.e. over 3,300) to the bridge traffic. At 5,432, University District trips comprise 13.2 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	To the Study Area	From the Study Area	Total Trips
PM Peak Trips	25,174	89,993	115,168
Study Area Trips Crossing SR 520 Bridge	2,103	3,329	5,432
Percent of Case Study Trips Crossing SR 520 Bridge	8.4%	3.7%	4.7%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There are only two CTR employers in the University District that provided updates to the CTR database. The mode-split for these employers is shown in Table 3-5. Compared with other case study areas, the University District has a relative low drive-alone mode split.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	Carpool	Vanpool	Transit	Non-Motorized	Other
1993	2	49%	14%	11%	19%	6%	1%
1995	2	53%	13%	11%	19%	3%	1%
1997	2	50%	14%	14%	18%	4%	1%
1999	2	50%	14%	13%	16%	6%	1%
2001	2	54%	12%	11%	16%	6%	1%

4.0 History with TDM and Land Use Strategies

Generally, the employers in Seattle are responsible for the CTR programs, and King County Metro plays a much larger role than the City of Seattle in terms of CTR program development.

Table 4-1 lists the percent of University District employers who stated that they either did or did not offer a TDM program.

The University of Washington is bound to the Major Institutions Ordinance, which has a significant trip reduction component The Major Institutions Ordinance originally prompted the U-Pass program, which gives the University of Washington students, faculty and staff additional resources to reduce the number of SOV trips. For a quarterly fee, members get the following benefits:

- Full fare coverage for Metro Transit, Community Transit, and Sound Transit buses
- Full fare coverage for Sounder commuter train service
- Free parking for carpools
- Free rides on the Night Ride Shuttle
- Subsidized vanpool fares
- Discounts at area businesses
- Guaranteed Ride Home
- Discounted occasional parking

There is also special pedestrian-oriented zoning in place along University Way. The City has implemented traffic calming measures (bus pullouts, curb bulbs, and midblock crosswalks) along University Way and is in the midst of more streetscape improvements.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	33%	33%	67%	33%
	No	67%	67%	33%	67%
Telecommuting	Yes	0%	33%	67%	67%
	No	100%	67%	33%	33%
Flex Time	Yes	67%	33%	100%	100%
	No	33%	67%	0%	0%
Guaranteed Ride Home	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Ridematching Services	Yes	67%	67%	67%	33%
	No	33%	33%	33%	67%
Shuttle Service	Yes	33%	67%	33%	33%
	No	67%	33%	67%	67%
Bike Subsidy	Yes	0%		0%	33%
	No	100%		100%	67%
Walking Subsidy	Yes	0%	0%	0%	33%
	No	100%	100%	100%	67%
Carpool Subsidy	Yes	67%	67%	33%	33%
	No	33%	33%	67%	67%
Vanpool Subsidy	Yes	100%	67%	67%	67%
	No	0%	33%	33%	33%
Transit Subsidy	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Ferry Subsidy	Yes	33%	33%	33%	33%
	No	67%	67%	67%	67%
Gen. Transportation Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Uncovered Bicycle Parking	Yes	67%	67%	100%	0%
	No	33%	33%	0%	100%
Covered Bicycle Parking	Yes	100%	100%	67%	67%
	No	0%	0%	33%	33%
Passenger Loading Area	Yes	67%	67%	67%	0%
	No	33%	33%	33%	100%
Shower Facilities	Yes	67%	67%	67%	67%
	No	33%	33%	33%	33%

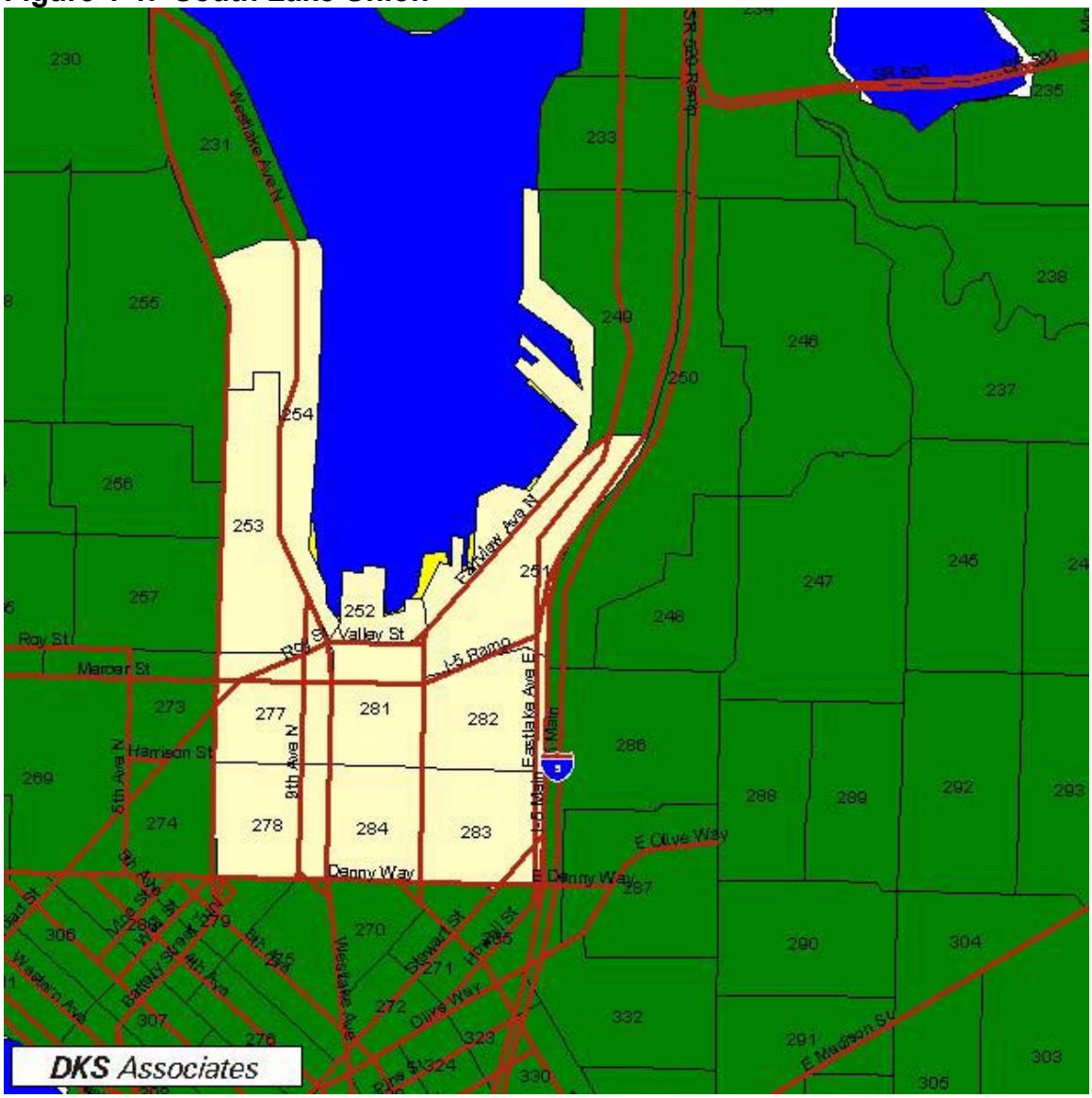
South Lake Union

1.0 Setting and Physical Characteristics

1.1 Location

South Lake Union is bordered to the west by Aurora Avenue N, to the east by I-5 and Eastlake Avenue N, to the south by Denny Way and to the north by Crockett Street on the west side of Lake Union and E. Lynn Street on the east side of the lake. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. South Lake Union



1.2 Land Use Character and Mix

South Lake Union is an urban area in the heart of Seattle. It has easy access to Downtown Seattle, the University District and many other places within the City of Seattle. The majority of the land in the southern study area is warehouse/light industrial. Restaurants surround the waterfront and a growing biotech corridor is on the eastside of the lake.

Lake Union is a designated Hub Urban Village under Seattle's 1994 Comprehensive Plan. As such, it was eligible for funding to develop a neighborhood plan. Planning for the area was delayed, however, as the City considered the prospect of creating a major urban park, "The Commons," in the heart of the neighborhood and revising zoning and circulation systems in conjunction with the park. Funding for the park and approval for an area master plan was placed before the voters in 1995; the vote failed to pass the proposal.[1] Microsoft co-founder Paul Allen owns a great deal of land in the area and has started to redevelop some of that property. The eventual impact of this redevelopment could be quite extensive.

1.3 Access to Freeways and State Facilities

South Lake Union is bordered by SR 99 to the west and I-5 to the east. In addition, SR 520 is located close by and gives access to eastern King County.

I-5. This interstate highway runs just west of the study area and follows in the north-south direction from Canada down to Mexico. Locally, it runs from northern King County, through downtown Seattle, to southern King County. For travelers to/from the University District, it provides for a wide range of destinations. Access to this freeway is provided from Mercer Street.

SR 99. This highway is west of the study area and provides access to downtown Seattle to the south, and northern Seattle to the north. Access to SR 99 in the study area is provided from any of the East-West streets in the area. This highway is parallel to I-5 and rejoins it to the south north of Sea-Tac Airport and to the north in Snohomish County.

SR 520. This highway western end is at the study area, where SR 520 meets I-5. It provides access to the Bellevue, Kirkland, and Redmond areas, as well as other parts of eastern King County.

1.4 Roadway Network

Some of the main roads used to enter South Lake Union are Dexter Avenue N. and Westlake Avenue from the northwest, Denny Way running east and west, and Eastlake Avenue from the northeast.

1.5 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.5.1 Existing Transit Service

The following bus routes serve the South Lake Union area:

Route 3 services Madrona, Central District, First Hill, Downtown Seattle, Belltown, Seattle Center East, and North Queen Anne. This route operates seven days a week and has an AM peak hour headway of 15

[1] South Lake Union Neighborhood Plan. December 5, 1998; p 5.

minutes. Route 4 provides Service to and from N Queen Anne before 6:30 am, after 7:00 pm, and all day Sunday.

Route 4 services Judkins Park, Central District, First Hill, Downtown Seattle, Belltown, Seattle Center East, and East Queen Anne. This route operates seven days a week and has an AM peak hour headway of 15 minutes.

Route 8 services Rainier Valley, Capitol Hill, Group Health Hospital, the Seattle Center, and Lower Queen Anne. This route operates seven days a week and has an AM peak hour headway of 15 minutes.

Route 16 services the Coleman Dock-Ferry Terminal, Downtown Seattle, the Seattle Center, Wallingford, East Green Lake, North Seattle Community College, the Northgate Mall, and the Northgate Transit Center. This route operates seven days a week and has a peak hour headway of 10 minutes.

Route 17 services Downtown Seattle, Westlake, Seattle Pacific University, Ballard, Sunset Hill, and Loyal Heights. This route operates seven days a week and has a peak hour headway of 20 minutes.

Route 26 services Downtown Seattle, Dexter Ave N, Fremont, Wallingford, Latona Ave NE, and East Green Lake. This route operates seven days a week and has a peak hour headway of 10 minutes.

Route 28 services Downtown Seattle, Dexter Ave N, Fremont, Ballard, Whittier Heights, and Broadview. This route operates seven days a week and has an AM peak hour headway of 9 minutes. Shuttle service is offered every evening and all day Sunday, connecting at N 34th St and Fremont Av N with Route 26 for service to and from downtown Seattle.

Route 66 services Coleman Dock-Ferry Terminal, Downtown Seattle, Eastlake, University District, Maple Leaf, Northgate Transit Center, Northgate Mall, and Northgate P&R. This route operates seven days a week and has a peak hour headway of 20 minutes.

Route 70 services Downtown Seattle, Fairview Ave N, Eastlake, and the University District. This route operates six days a week and has a peak hour headway of 12 minutes.

Route 71 services Downtown Seattle (Tunnel), Eastlake, University District, Ravenna, View Ridge, and Wedgwood. This route operates seven days a week and has a peak hour headway of 30 minutes.

Route 72 services Downtown Seattle (Tunnel), Eastlake, University District, Maple Leaf, and Lake City. This route operates seven days a week and has a peak hour headway of 30 minutes.

Route 73 services Downtown Seattle (Tunnel), Eastlake, University District, Green Lake P&R, Maple Leaf, and Jackson Park. This route operates seven days a week and has a peak hour headway of 12 minutes.

There are no official park and ride facilities in South Lake Union.

1.5.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high

frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

Over the next thirty years, the South Lake Union area should see a large increase in the number of high frequency bus routes that run through the area providing better service to nearby communities.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000	1		8	118	**127**
	2030	1		38	66	**105**
Mid-Day	2000	2	1	5	102	**110**
	2030	1		20	24	**45**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000	4		38	206	**248**
	2030	4		215	130	**349**
Mid-Day	2000	8	2	25	182	**217**
	2030	4		102	60	**166**

1.6 Parking Supply, Availability and Price

Parking dynamics vary widely with the neighborhood, and it has only been in the past few years that a noticeable problem has surfaced. South Lake Union has enjoyed free-on-street parking and benefited from numerous low cost surface parking lots scattered throughout the neighborhood. The first area to feel the pressure was the Lake Union waterfront, where numerous successful area restaurants and businesses have taxed the limited parking supply. Other areas in the South Lake area have felt the pressure of additional parking demand, especially since some new developments are not required to construct parking as part of a City TDM strategy to reduce drive alone trips.

Parking supply is adequate throughout much of the study area, although there are areas where existing and future demand is expected to exceed the available supply. Available parking is a major concern to many locals, and solutions are specifically addressed in their neighborhood plan.[2]

The base parking supply was taken from a parking study performed by Mirai Associates. To extrapolate to 2030, an assumption was made that regional development would require existing regional parking requirements. The results are shown in Table 1-3.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	817	1,128	14,055	**16,000**
2000 Demand	681	548	6,489	**7,718**
2000 D/S Ratio	0.83	0.49	0.46	**0.48**
2030 Supply				**19,739**
2030 Demand				**9,632**
2030 D/S Ratio				**0.49**

[2] South Lake Union Neighborhood Plan, December 5, 1998

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$1.44	$3.48
Carpool	$1.31	$3.17
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

The South Lake Union area generally follows a grid format, allowing for good pedestrian access to the nearby amenities.

There is one heavily used bike lane in the area that follows Dexter Avenue N. from the Fremont Bridge to Denny Way. In addition, Eastlake Avenue E., Fairview Avenue N. and Queen Anne Avenue are all commonly used by bicyclists.[3]

There are many barriers to pedestrian and bicycle users in the South Lake Union area. Denny Avenue has a steep hill and high traffic. Mercer, Fairview, Eastlake, and many other streets in the area have high traffic due to their proximity to the I-5 and SR 99 ramps, and since they are so close to downtown. There used to be a trail/bike path that went around the south end of Lake Union, but it is disconnected from other bike paths/destinations. However, the City of Seattle is doing a major reconstruction of Westlake Avenue that includes the construction of non-motorized pathways along that street.

2.0 Population and Employment Characteristics

Population and employment data for South Lake Union are discussed below.

2.1 Population

The population of the South Lake Union area is expected to triple in the next thirty years (See Table 2-1). The massive increase in density reflects the changes that the area is already undergoing - from light industrial zones to a more urban area with a greater mix of uses.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	0.71	
Population	3,778	14,543

[3] *Seattle Bicycling Guide Map, Seattle Transportation*, Bicycling and Pedestrian Program, Summer 2000

2.2 Employment

The total employment and the mix of employment are expected to remain relatively constant over the next thirty years. The employment forecast for the area includes three thousand more employees. These additional employees are fairly well distributed by both employment type and size of employer. (See Table 2-2 and Table 2-3).

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	2,977	3,390
Office	12,511	14,968
Other	6,745	5,516
Total	**22,233**	**23,874**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	5,582	2,773	7,879	5,999	22,233
2030	5,993	2,978	8,460	6,442	23,874

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the Crossroads area. Transit service is already high throughout the area, and is forecast to become even better over the next thirty years. In general, the mix of uses in the area is forecast to become slightly better, while the density is only forecast to change (from medium to high) in one zone.

Table 2-6 gives the population, employment and trips by local area TAZ for the South Lake Union area. These characteristics were summarized in earlier sections.

Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
251	High 2	High 1	Medium	Medium	Low	Medium
252	High 2	High 1	Medium	Medium	High	High
253	Medium 1	High 1	Low	Medium	Low	Low
254	High 2	High 1	Medium	Medium	High	High
277	High 1	High 1	Low	Low	High	High
278	High 1	High 1	Low	Medium	High	High
281	High 2	High 1	Low	Low	High	High
282	High 2	High 1	Low	Low	Medium	Medium
283	High 2	High 1	Medium	Medium	High	High
284	High 1	High 1	Medium	Medium	High	High

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
251	0.150	1,046	3,303	0	0	95	84	1,029	3,824	161	235
252	0.144	343	621	897	744	4,170	4,770	338	719	6,010	10,618
253	0.021	18	11	0	25	12	21	17	13	15	87
254	0.083	375	2,907	252	407	3,547	3,267	343	3,186	4,051	8,401
277	0.041	268	1,441	306	563	3,704	4,425	572	1,283	5,111	8,373
278	0.057	848	323	225	204	1,146	1,388	211	353	1,589	2,781
281	0.042	373	3,330	151	112	2,373	2,058	508	1,975	3,278	3,846
282	0.051	29	100	256	222	669	396	33	118	1,135	1,999
283	0.066	347	1,118	215	636	1,107	1,513	389	1,320	1,581	2,178
284	0.058	131	1,389	675	477	2,433	2,562	146	1,640	3,670	5,098

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	3	6	1	0	0	0	10
	2030 Base	10	0	0	0	0	0	10
Population	2000 Base	1,247	2,514	18	0	0	0	3,778
	2030 Base	14,543	0	0	0	0	0	14,543
Total Employment	2000 Base	8,489	13,732	12	0	0	0	22,233
	2030 Base	23,874	0	0	0	0	0	23,874

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. As the population of South Lake Union is expected to triple over the next 30 years, it is not surprising that the

number of trips by residents is expected to increase dramatically as well. Additionally, while the number of people commuting to South Lake Union is forecast to increase by about 18,500, the PSRC/Trans-Lake forecast expects only about 2,500 additional vehicle trips. This is most likely attributable to the high level of transit service that is forecast for the base scenario.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	26,602	43,616	18,602	18,457
Employed Residents	3,586	14,431	2,496	6,983

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work by South Lake Union employees are illustrated in Table 3-2. As one would expect, the vanpool users traveled much farther than the other modes, with drive alone and transit users traveling about the same distance.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	14
Carpool	17
Vanpool	25
Transit	14
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 3.4 percent of the PM peak period vehicle trips to and from South Lake Union cross the SR 520 bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering the South Lake Union use the bridge, although trips leaving the study area contribute a higher total number of vehicles (i.e. over 1,400) to the bridge traffic. At 2,660 South Lake Union trips comprise 6.5 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	To the Study Area	From the Study Area	Total Trips
PM Peak Trips	20,220	58,769	78,989
Study Area Trips Crossing SR 520 Bridge	1,186	1,473	2,660
Percent of Case Study Trips Crossing SR 520 Bridge	5.9%	2.5%	3.4%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There were between twelve and fourteen CTR employers that provided updates to the CTR database in the South Lake Union area on any given year. The mode-split for these employers is shown in Table 3-5. In the last analysis period (2001), the percent of users who drive alone dropped dramatically.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	**Carpool**	**Vanpool**	**Transit**	**Non-Motorized**	**Other**
1993	12	68%	15%	1%	10%	5%	1%
1995	14	66%	17%	1%	9%	5%	1%
1997	14	65%	17%	1%	11%	6%	1%
1999	14	60%	16%	3%	13%	7%	1%
2001	14	53%	19%	3%	18%	7%	1%

Source: DKS Associates

4.0 History with TDM and Land Use Strategies

Generally, the employers in Seattle are responsible for the CTR programs, and King County Metro plays a much larger role than the City of Seattle in terms of CTR program development.

Table 4-1 lists the percent of South Lake Union employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	45%	57%	53%	44%
	No	55%	43%	47%	56%
Telecommuting	Yes	45%	46%	60%	63%
	No	55%	54%	40%	38%
Flex Time	Yes	55%	57%	80%	75%
	No	45%	43%	20%	25%
Guaranteed Ride Home	Yes	64%	86%	53%	44%
	No	36%	14%	47%	56%
Ridematching Services	Yes	55%	71%	53%	50%
	No	45%	29%	47%	50%
Shuttle Service	Yes	9%	7%	7%	6%
	No	91%	93%	93%	94%
Bike Subsidy	Yes	9%	50%	20%	31%
	No	91%	50%	80%	69%
Walking Subsidy	Yes	9%	14%	20%	25%
	No	91%	86%	80%	75%
Carpool Subsidy	Yes	9%	14%	20%	38%
	No	91%	86%	80%	63%
Vanpool Subsidy	Yes	82%	71%	93%	75%
	No	18%	29%	7%	25%
Transit Subsidy	Yes	100%	93%	93%	81%
	No	0%	7%	7%	19%
Ferry Subsidy	Yes	64%	64%	67%	56%
	No	36%	36%	33%	44%
Gen. Transportation Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	73%	71%	73%	69%
	No	27%	29%	27%	31%
Uncovered Bicycle Parking	Yes	27%	29%	33%	0%
	No	73%	71%	67%	100%
Covered Bicycle Parking	Yes	73%	71%	87%	75%
	No	27%	29%	13%	25%
Passenger Loading Area	Yes	55%	50%	47%	0%
	No	45%	50%	53%	100%
Shower Facilities	Yes	82%	79%	87%	81%
	No	18%	21%	13%	19%

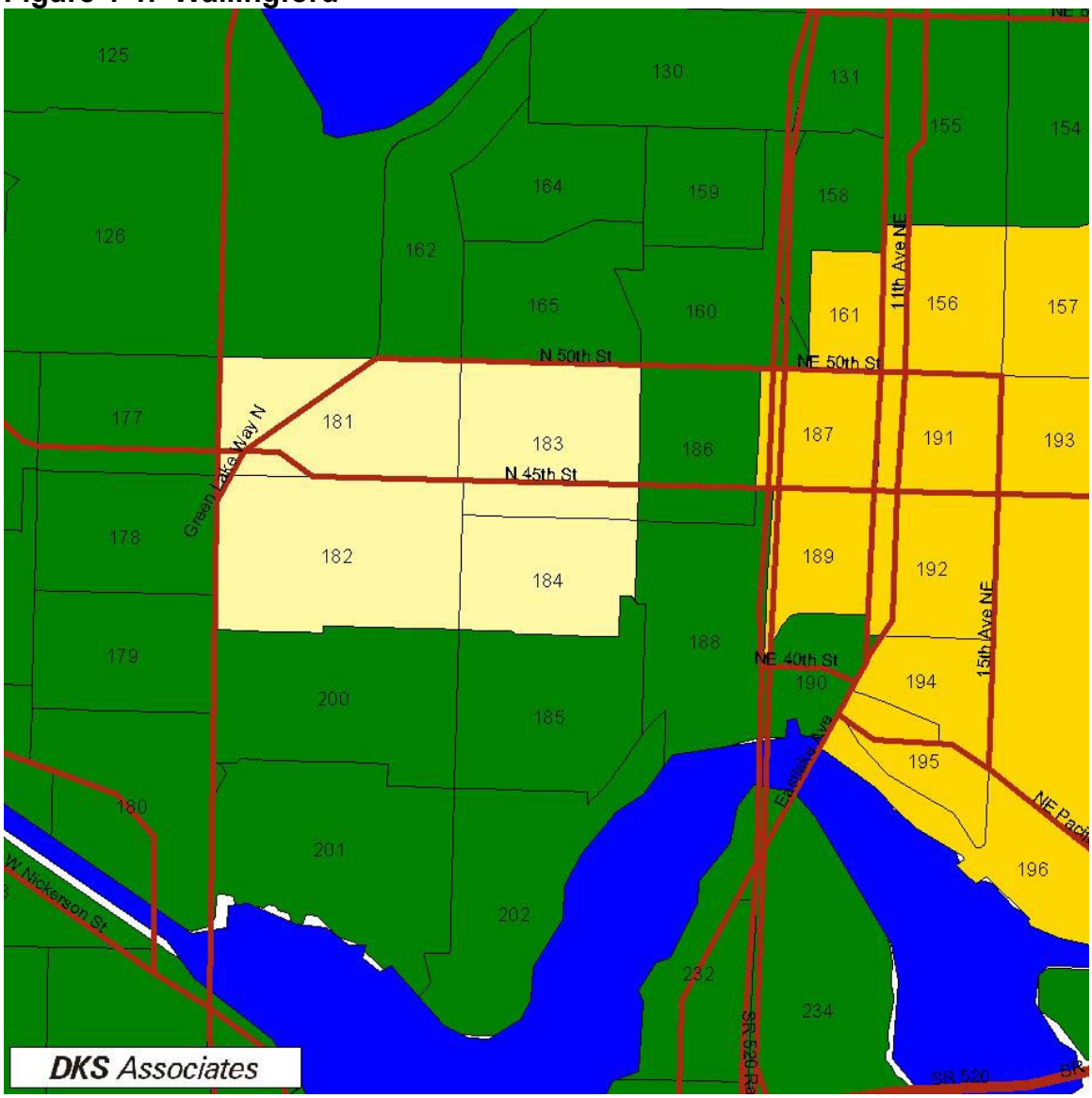
Wallingford

1.0 Setting and Physical Characteristics

1.1 Location

Wallingford is located in north Seattle, bordered to the north by N. 50th Street, to the south by N. 41st Street, to the west by Aurora Avenue N. and to the east by 1st Avenue NE. Figure 1-1 illustrates the boundaries of the Wallingford area, along with the Urban Village boundary, as defined by the City of Seattle.

Figure 1-1. Wallingford



1.2 Land Use Character and Mix

Wallingford is designated a Residential Urban Village by the City of Seattle. Residential Urban Villages, as defined by Seattle, are intended for concentrations of low to moderate densities of predominately residential development with a compatible mix of support services and employment.

The 45th Street Corridor, and particularity the district that runs from Stone Way to Sunnyside Avenue N., is the heart of Wallingford. It is the identifying characteristic of the neighborhood, is blessed with a landmark school building, and may be the definition of the "urban village." The existing pedestrian and commercial district along 45th Street creates a center for transit, services, and residential development. Its vitality reflects its history as a working class suburb connected by streetcar to jobs and the central city, and depends on a blend of business health, a pedestrian-friendly character, and the pattern of land uses that help make it viable.

Most residences in the study area are bungalow style single-family homes that have become very attractive in the past decade, escalating sales prices. North 45th Street has a movie theatre, boutiques, small restaurants, and the Wallingford Center, an actual school house built in the early 1900s and renovated to hold over twenty retail shops, restaurants, and apartments on the top floor.

1.3 Access to Freeways and State Facilities

One freeway and one state highway give access to the study area: I-5 and SR 99. In addition, SR 520 is located close by and gives access to eastern King County.

I-5. This interstate highway runs east of the study area and follows in the north-south direction from Canada down to Mexico. Locally, it runs from the northern King County, through downtown Seattle, to southern King County. For travelers to/from Wallingford, it provides for a wide range of destinations. Access to this freeway is provided from either 45th Street NE or 50th Street NE.

SR 99. This highway is west of the study area and provides access to downtown Seattle to the south, and northern Seattle to the north. Access to SR 99 in the study area is provided from any of the East-West streets in the area. This highway is parallel to I-5 and rejoins it to the south north of Sea-Tac Airport and to the north in Snohomish County.

SR 520. This highway is just south of the study area and provides access to the Bellevue, Kirkland, and Redmond areas, as well as other parts of eastern King County.

1.4 Roadway Network

North 45th Street is the main corridor in the study area, and connects the area with both the University District and I-5. The three-lane configuration on North 45th Street allows access, calms traffic, and moves considerable vehicle volume through the neighborhood. South and west of the study area is the Fremont Bridge, a main route into Downtown Seattle. North 50th Street, on the northern border of the study area, is two lanes and also provides access to I-5 and SR 99.

1.5 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.5.1 Existing Transit Service

The following routes provide service to the Wallingford Area:

Route 16 services the Coleman Dock-Ferry Terminal, Downtown Seattle, the Seattle Center, Wallingford, East Green Lake, North Seattle Community College, the Northgate Mall, and the Northgate Transit Center. This route operates seven days a week and has an AM peak hour headway of 10 minutes.

Route 26 services Downtown Seattle, Dexter Ave N., Fremont, Wallingford, Latona Ave NE, and East Green Lake. This route operates seven days a week and has an AM peak hour headway of 10 minutes.

Route 31 services Magnolia, Seattle Pacific University, Fremont, Wallingford, and the University District. This route operates on weekdays and Saturdays.

Route 44 services Government Locks, Ballard, Wallingford, the University District, the UW Campus, and Montlake. This route operates seven days a week and has an AM peak hour headway of 10 minutes.

Route 46 services Golden Gardens, Government Locks, Ballard, Fremont, Wallingford, and the University District. This route operates on weekdays (peak direction only).

Route 74 services Downtown Seattle (peak hours only), the Seattle Center, Fremont, Wallingford, the University District, Ravenna, Sand Point, and NOAA. This route operates seven days a week.

Route 82 is a nightly route servicing Downtown Seattle, Seattle Center, Queen Anne, Fremont, Wallingford, East Green Lake, and Greenwood.

1.5.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

Over the next thirty years, Wallingford is forecast to receive better transit service with more high frequency bus service.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			2	13	**15**
	2030			7	4	**11**
Mid-Day	2000				12	**12**
	2030			5	2	**7**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			11	27	**38**
	2030			34	8	**42**
Mid-Day	2000				28	**28**
	2030			22	6	**28**

There are no official park and ride facilities in Wallingford.

1.6 Parking Supply, Availability and Price

The Seattle Comprehensive Neighborhood Parking Study lists both the parking supply and utilization for the Wallingford area as shown in Table 1-3. Unfortunately, the City was not able to count all of the parking in the Wallingford Urban Village; instead they used a sample of 16 blocks. Supplemental parking counts were performed in the rest of the study area by Mirai Associates

Table 1-3. On-Street and Off-Street Parking Supply and Utilization

Parking Supply		
	On-Street	550
	Off-Street	382
	Loading	18
	Total:	**950**
Average Parking Usage		
	On-Street	56%
	Off-Street	47%
	Total:	**52%**
Peak Hour Parking Usage		
	On-Street	62%
	Off-Street	60%
	Total:	**61%**
Source: Comprehensive Neighborhood Parking Study, August 2000		

The parking supply along the key corridor, N 45th Street, is shown in Table 1-4.

Table 1-4. N 45 Street Parking Supply

Location			Parking Spaces			Parking Lots		
From	To	Side of Street	1 Hour	2 Hour or Unlimited	Loading	Small	Medium	Large
Stone Way	Interlake	South	0	5	1			
		North	0	11	0	1		
Interlake	Woodlawn	South	0	8	2	2		
		North	0	5	0			
Woodlawn	Densmore	South	0	9	1			
		North	0	7	1	1		
Densmore	Wallingford	South	6	0	3	1		
		North	6	0	1			1
Wallingford	Burke	South	0	0	0			1
		North	0	2	0		1	
Burke	Meridian	South	0	8	2	1		
		North	11	0	0			
Meridian	Bagley	South	4	0	3			
		North	5	0	1			
Bagley	Corliss	South	6	0	0			1
		North	7	0	3		1	
Corliss	Sunnyside	South	7	0	1			
		North	0	0	0	1	1	
Sunnyside	Eastern	South	0	8	0			1
		North	0	6	2			
Eastern	1st NE	South	0	6	0			
		North	3	3	0			
1st NE	2nd NE	South	0	0	0			1
		North	0	0	2			
2nd NE	Thackery	South	0	6	0		2	
		North	5	0	0	1		
		Totals:	**60**	**84**	**23**	**8**	**5**	**5**
Source: Wallingford Corridor Study, August 1997								

In Wallingford, there is only one paid parking lot. This is where a Washington Mutual Bank contracts their surface parking lot in the evening to Diamond parking. There are approximately 61 parking spaces there, and the rate for this parking is unknown at this time.

As there are no public pay parking lots during the day in Wallingford, it is quite unlikely that any employees pay for parking.[1]

Table 1-5 lists the parking supply and demand data that was used within the TEEM model.

[1] Mary Catherine Snyder, email 3/29/02

Table 1-5. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	227	6	813	**1,046**
2000 Demand	117	3	504	**624**
2000 D/S Ratio	0.52	0.50	0.62	**0.60**
2030 Supply				**2,694**
2030 Demand				**779**
2030 D/S Ratio				**0.29**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-6.

Table 1-6. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$1.66	$4.03
Carpool	$1.20	$2.90
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

Wallingford was designed in a grid format allowing for good pedestrian access to the nearby amenities. The sidewalk network is nearly complete, and there are no major barriers for pedestrians or cyclists within the study area (although SR 99 does form a barrier at its western edge). While there are no official bike lanes in Wallingford, North 45th Street (east/west), Interlake Avenue North (north/south) and Wallingford Avenue North (north/south) are commonly used by bicyclists.[2] Many of the streets within the study areas are low-traffic residential streets and good for cycling, although there are a few hills. The Burke-Gilman trail, a major non-motorized corridor, runs from Redmond to Ballard and is located just south of the study area.

2.0 Population and Employment Characteristics

Population and employment data for the Wallingford area are discussed below.

2.1 Population

The population of the Wallingford area is expected to increase by almost 14 percent over the next thirty years (See Table 2-1). Compared with many of the other study areas, this is fairly low growth, and is related to the fact that the area is already built out, and the single family areas of the neighborhood will,

[2] *Seattle Bicycling Guide Map, Seattle Transportation*, Bicycling and Pedestrian Program, Summer 2000

for the most part, remain zoned for single-family dwellings. Most of the densification that is expected in the area will come from people replacing existing buildings with larger buildings.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	0.51	
Population	4,846	5,511

2.2 Employment

The employment forecast for the area includes fifteen hundred more employees, or a 40 percent increase. These additional employees are fairly well distributed by both employment type and size of employer as illustrated in Table 2-2 and Table 2-3.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	759	871
Office	2,226	3,761
Other	745	602
Total	**3,730**	**5,233**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	1,688	793	1,248	0	3,730
2030	2,369	1,113	1,751	0	5,233

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table 2-5 illustrates the land use characterizations for the Wallingford area. For most zones, the transit service is forecast to increase from medium service to high service by 2030. The mix of uses in the four Wallingford TAZs is at the medium level and is not expected to change in the future. As more employers and residents move into the area, two of those zones are expected to reach a high level of density. Table 2-6 gives the population, employment and trips by local area TAZ for the Wallingford area. These characteristics were summarized in earlier sections. Table 2-7 illustrates that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
181	Medium 2	High 2	Medium	Medium	Low	Low
182	Medium 1	High 1	Medium	Medium	Medium	High
183	Medium 2	Medium 2	Medium	Medium	Medium	Low
184	Medium 2	High 1	Medium	Medium	Low	High

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
181	0.128	988	1,239	194	232	228	230	925	1,278	551	1,250
182	0.166	1,825	2,191	202	203	2,135	2,048	1,708	2,259	2,744	4,142
183	0.124	1,259	1,404	357	232	594	229	1,099	1,545	1,108	1,594
184	0.088	775	677	6	204	14	1,856	676	745	49	54

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	0	1	3	0	0	4
	2030 Base	2	1	0	1	0	0	4
Population	2000 Base	0	0	1,825	3,021	0	0	4,846
	2030 Base	2,868	1,239	0	1,404	0	0	5,511
Total Employment	2000 Base	0	0	2,337	1,393	0	0	3,730
	2030 Base	4,311	461	0	461	0	0	5,233

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. The vehicle trips for residents of Wallingford are forecast to decrease modestly, probably due to much better

transit service in the future. The forecast does call for additional person and vehicle trips among study area employees.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	4,452	7,040	3,659	5,118
Employed Residents	4,408	5,827	2,936	2,623

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work by Wallingford employees was estimated based on the distance that employees located at similar locations traveled. These values are illustrated in Table 3-2. Similar to most of the other case study areas, vanpoolers to Wallingford typically drive twice as far as single-occupancy vehicles.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	12
Carpool	16
Vanpool	25
Transit	13
Non-Motorized	0

3.3 SR 520 Corridor Trips

Just over 2 percent of the PM Peak vehicle trips to and from Wallingford cross the SR 520 bridge. As shown in Table 3-3, both a higher percentage and a higher number of vehicle trips entering Wallingford use the bridge. At 532, Wallingford trips comprise 1.3 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	To the Study Area	From the Study Area	Total Trips
PM Peak Trips	7,485	18,411	25,896
Study Area Trips Crossing SR 520 Bridge	291	241	532
Percent of Case Study Trips Crossing SR 520 Bridge	3.9%	1.3%	2.1%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There are no CTR employers in Wallingford Area, so no historical mode share information is available.

4.0 History with TDM and Land Use Strategies

Generally, the employers in Seattle are responsible for the CTR programs, and King County Metro plays a much larger role than the City of Seattle in terms of CTR program development. In Wallingford there are no CTR employers, and therefore no CTR mode shares to report. However, the City of Seattle has worked with a group of Wallingford employers to reduce vehicle trips. The programs in place as of November 2001[3] were:

- **Distribution of Transit Tickets At a Full or Partial Subsidy** (although response to this program has been less than expected)
- **Guaranteed Ride Home** (although to date, no employer has signed up to take advantage of this program offered through the Chamber of Commerce)
- **Flexible Work Schedules** (lots of business offer this benefit, although that is the nature of retail employment, so not sure how much to attribute to the program)
- **Kiosks and Bicycle Racks** (lots of bicycle racks throughout the neighborhood, and the City of Seattle plans to install a neighborhood kiosk)
- **Transit Fun Map** (in development)
- **Promotions** (Wallingford promotes alternative transportation modes through fairs and parades).

In addition, Wallingford has a Parking Strategies Committee that put together the following seven recommendations:

1. Adjust parking time limit signs.
2. Explore angled parking in selected areas
3. Improve parking enforcement
4. Install limited parking signs along streets within 1/3 block of 45th Street
5. Remove selected paring spaces near intersections to improve transit
6. Move or consolidate Load Zones to improve access
7. Eliminate peak period parking on the south side of 45th Street.

[3] City of Seattle – Seattle Transportation Program, Contact Kathy Anderson, Seattle Transportation 684-5017, Wallingford Trip Reduction Initiative --- November 2001 Update.

The programs mentioned above demonstrate that the Wallingford community takes the responsibility of providing alternative transportation options seriously.

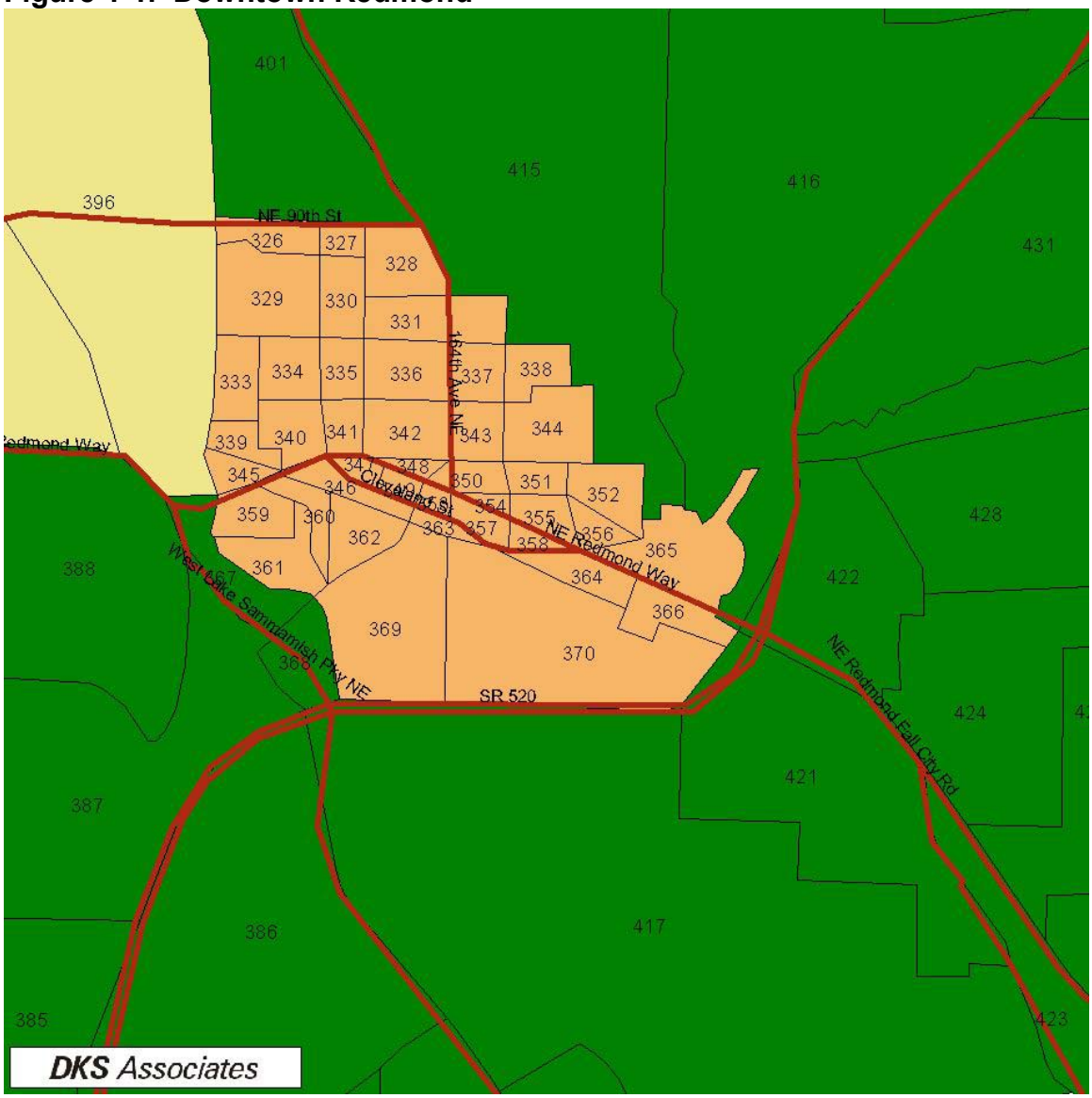
Downtown Redmond

1.0 Setting and Physical Characteristics

1.1 Location

The study area includes the "officially designated" downtown area as noted in the Redmond Comprehensive Plan. It extends from Bear Creek Parkway and Redmond Town Center on the south to NE 90th St on the north, and from 166th Ave NE on the east to the Sammamish River Slough on the west. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Downtown Redmond



1.2 Land Use Character and Mix

Redmond's Downtown is a regionally designated Urban Center and is recognized as such in all relevant local, regional policy, planning and programming forums.

The City's vision for Downtown has been stable since the mid 1980's and through many updates since then.[1] As the financial and business center of the city, Downtown Redmond is dominated by office and retail uses. In addition, the area serves as a regional retail outlet with a large shopping center and other retail stores and residential housing. It is a major employment center, and this central role is expected to be reinforced by continual growth in office development. The Downtown area exhibits relatively high employment and residential densities, with those densities planned to increase significantly as growth occurs. Currently, residential uses are allowed on the upper floors of every downtown district. [2]

Downtown Redmond includes the land designated as the City Center and is guided by the City Center Policies in the City's Comprehensive Plan. The City Center area is recognized as the City's primary center in the Comprehensive Plan. City Center development regulations allow property owners the option of making payments to a fund to provide public parking rather than providing parking on-site in part of Downtown.[3] The City Center development regulations also give a floor area bonus for contributions to the parking fund.

1.3 Access to Freeways and State Facilities

SR 520 is the only freeway providing access to and through the City of Redmond. It provides access to employment and residential areas in Bellevue and Seattle. It also provides access to I-405 for connections on the east side of Lake Washington. SR 520 ends near the intersection with SR 202 and merges into Avondale Ave NE, which continues northeast eight miles to Woodinville-Duvall Road. SR 520's major exits to downtown Redmond are at the West Lake Sammamish Pkwy, SR 202 (Redmond Way), and Avondale Way/Union Hill Road.

1.4 Roadway Network

The transportation elements of the City's 1995 Comprehensive Plan established a hierarchy of streets serving the City. This hierarchy is based on the desired function of the facility to serve local traffic, through traffic, or a combination of local and through traffic. The principal arterials provide access to/from the City and the freeways and connect activity centers. The minor arterials provide connections to the principal arterials and connections with higher density activity centers. These connections are supplemented with a system of collector arterials. The City's planned arterial system includes streets that are up to 5 lanes wide.

In Downtown Redmond, the principal arterials are as follows:

- **SR 908**. This highway provides the main access from Redmond to Kirkland providing access to the west and access to I-405 at Kirkland. This roadway is a principal arterial and is also known as NE 85th Avenue.

[1] The following information was taken from the Redmond Comprehensive Plan posted on-line at MSRC website.
[2] Comment taken from the Connecting Redmond Website; Key Issues – Land Use.
[3] Cited in the Comprehensive Plan, page 51.

- **SR 202**. SR 202 is a principal arterial that links Redmond with Snoqualmie Falls to the south and Woodinville to the north. SR 202 is also part of Redmond Way from SR 520 to 164th Ave NE; and part of 164th Ave NE from Redmond Way to NE 85th Street.
- **NE Redmond Way** is a one-way couplet with Cleveland Street serving westbound traffic. NE Redmond Way becomes SR 202 east of intersection 164th Avenue NE (SR 202) to its terminus at E. Lake Sammamish Pkwy NE (SR 202 then becomes known as the Redmond Fall City Road). To the north, NE Redmond Way becomes SR 908 at the intersection with W. Lake Sammamish Parkway. SR 908 connects downtown Redmond with Kirkland; at the city limits with Kirkland (132nd Ave NE), NE Redmond Way becomes known as NE 85th Avenue.
- **Redmond-Woodinville Road NE** is a principal arterial, also known as State Route 202 connecting the City of Woodinville with Redmond. At 85th Street, the roadway becomes also known as 164th Avenue NE.
- **NE 90th Street** is an east-west principal arterial linking the Woodinville Redmond Road NE to Willows Road.
- **160th Ave NE** is a north-south principal arterial from Redmond Way NE linking high density housing units in the north part of Redmond to downtown Redmond.
- **Avondale Road,** a principal arterial**,** starts at the end of SR 520 and carries traffic to the east linking to Union Hill Road, Novelty Hill Road and Woodinville-Duvall Road

The minor arterials in Downtown Redmond include NE 85th Street; Leary Way NE, Bear Creek Parkway; Avondale Way. All these roadways serve as linkages between principal arterials, and as such carry high volumes of traffic; many as high as on nearby principal arterials.

The collector arterials in Downtown Redmond include 158th Ave NE, 161st Ave NE, NE 83rd Street, NE 80th Street, and NE 79th Street.

1.5 Transit Services

1.5.1 Existing Transit Service

The existing and future transit service levels are discussed in the following sections.

Route 220 services Redmond P&R, Redmond Town Centre, Rose Hill, South Kirkland P&R, Bellevue. This route operates five days a week.

Route 230 services Kingsgate P&R, Totem Lake, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, Redmond P&R. This route operates seven days a week.

Route 232 services Duvall, Cottage Lake, English Hill, Redmond P&R, SR-520, I-405, Bellevue, Bellevue Transit Center. This route operates weekdays with a 15 minute AM peak hour headway.

Route 233 services Avondale Rd NE & Avondale Pl NE, Bear Creek P&R, 148th Ave NE, 156th Ave NE, Microsoft, Overlake Transit Center, Overlake, Bell-Red Rd, Bellevue Transit Center. This route operates on weekdays with a 30 minute AM peak hour headway and on Saturdays.

Route 249 services Redmond P&R, West Lake Sammamish Pkwy, Sammamish Viewpoint Park, Overlake, Overlake P&R, NE 20th St., 116th Ave. NE, Bellevue. This route operates Saturdays and weekdays with a 30 minute AM peak hour headway.

Route 250 services Redmond P&R, West Lake Sammamish Parkway, Sammamish Viewpoint, Overlake, Overlake P&R, Montlake, Downtown Seattle. This route operates weekdays only during the peak period with a 25 minute AM peak hour headway.

Route 251 services Kirkland Transit Center, Houghton P&R, Redmond P&R, Bear Creek P&R, Cottage Lake, Woodinville P&R, Bothell, UW Bothell Campus. This route operates weekdays and Saturdays; with a 30 minute AM peak hour headway on the weekdays.

Route 253 services Bear Creek P&R, Redmond P&R, Redmond Civic Center, 148th Ave NE, Overlake, Overlake P&R, Crossroads, Bellevue Transit Center. This route operates seven days a week and has a 40 minute AM peak hour headway.

Route 254 services Kirkland Transit Center, Houghton P&R, Redmond P&R, Education Hill. This route operates seven days a week with 40 minute headway in the AM peak hour.

Route 265 services Downtown Seattle, SR-520 Freeway Stops, Houghton P&R, Rose Hill, and the Redmond P&R. This route operates weekdays during the peak periods only with 20 minute headway during the AM peak hour.

Route 266 services Bear Creek P&R, Redmond P&R, 148th Ave NE, SR-520 Freeway Stops, Downtown Seattle (tunnel). This route operates weekdays and has 15 minute AM peak hour headway.

Route 291 services Kingsgate P&R, N.E. 132nd St., Willows Rd. employment centers, Redmond Civic Center, Redmond P&R, and the Redmond Town Center. This route operates peak period only weekdays with a 30 minute AM peak hour headway. DART service is available during the day.

ST Route 540 services Bear Creek P&R, Redmond P&R, NE 85th St, Kirkland Transit Center, Northwest College, South Kirkland P&R, SR-520 Freeway stops, and the University District. Sound Transit operates this route with seven day a week service. The weekday headway in the AM peak hour is 30 minutes.

ST Route 540 services Downtown Seattle, SR-520 Freeway stops, Overlake Transit Center, and the Redmond P&R. The route is operated by Sound Transit weekdays with a 15 to 20 minute AM peak hour headway.

Route 922 services Carnation, NE Ames Lake Rd, Bear Creek P&R, and the Redmond P&R with connecting buses to and from Bellevue & Seattle and to the Redmond DART service. This route operates on weekdays with one route each direction in the peak period.

Route 929 services North Bend, Snoqualmie, Snoqualmie Falls, Fall City, Carnation, Stillwater, Duvall, W Snoqualmie Valley Rd NE, Novelty Hill Rd, and the Redmond P&R. This route operates weekdays with seven daily buses (four buses every 3 ½ hours); with no service in the AM peak hour.

There are two park-and-ride lots in Downtown Redmond. One is located in the center of town, creating additional traffic on local streets to access regional transit routes. It is located between 161st Ave NE and 162nd Ave NE, at NE 81st Street. The second park-and-ride lot is located just outside the study area, at NE Union Hill Road and 178th Ave NE.

The downtown park-and-ride lot also serves as a transit station. This is an unusual arrangement creating some conflicts of use. Generally, park-and-ride facilities are located on the outskirts of a city and function as an access point to regional transit services. This way, the park-and-ride actually intercepts vehicles that may be headed onto congested downtown streets. However, because of its downtown location, the Downtown Redmond park-and-ride actually forces cars onto downtown streets.

On an average weekday, there are currently about 1,900 transit trips[4] to and from Downtown Redmond. Of these, 28 percent are commuter trips for work and 72 percent are for other purposes. These transit trips amount to only 1 percent of all vehicle trips to, from and within Downtown Redmond. Transit's share of vehicle trips increases to 4 percent when counting only the work commute trips.

Of those 1,900 transit trips to, from, and within downtown Redmond, 34 percent are from origins or destinations within Redmond, 26 percent have origins or destinations elsewhere on the Eastside, and 40 percent have origins or destinations elsewhere in the Puget Sound region.

Downtown Redmond is currently served by:

- 13 all day routes/route segments
- 6 peak hour only routes
- 25 bus vehicle trips arrive in Downtown Redmond in the AM peak hour
- 33 bus vehicle trips depart from Downtown Redmond in the AM peak hour

The existing transit service to, from, and within Redmond is fairly good during the peak commuting hours in the morning and the afternoon if you are going to the regional centers (i.e. Bellevue or Seattle). Much of the service is focused on leaving Redmond in the morning and returning in the afternoon. Service during the middle of the day is much less frequent, and service to destinations other than the regional centers is generally not timely or convenient. One obvious difficulty is the lack of coordination between routes, forcing passengers to have long waits for connecting buses.

In the Central Business District, there are 16 bus routes with more than 2255 passengers each day. Nearly 57 percent of the riders use the downtown park-and-ride (1284 passengers/daily). Other stops with more than 50 daily riders are NE 83rd St/161st Ave NE (308); three stops along NE 85th St at 160th , 161st, 162nd Ave NE; West Lake Sammamish Parkway NE/Leary Way (55) and Cleveland St/167th Ave NE (54).

There are 3 main peak hour only routes (2 minor routes): Metro 265, Redmond via Houghton P&R (Kirkland) to Downtown Seattle (12 daily, 6 peak period); Metro 266 Redmond via 148th Ave NE to Downtown Seattle(30 daily, 15 peak period); Sound Transit 545, Redmond to Seattle Express (26 daily, 13 peak period); Metro 929 – only one each direction peak service into downtown Seattle, and custom school route (997). ST 540 offers 30-minute headways for service the UW of Washington all day.

1.5.2 Forecast for 2030 Transit Service

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions as shown in Table 1-1 and Table 1-2.

[4] Redmond City Council Meeting, November 13,2001; presentation slides

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				21	**21**
	2030			16	5	**21**
Mid-Day	2000				22	**22**
	2030			10	1	**11**

Table 1-2. Frequency of Service

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				34	**34**
	2030			72	10	**82**
Mid-Day	2000				33	**33**
	2030			40	2	**42**

1.6 Parking Supply, Availability and Price

Mirai Associates conducted an inventory of parking in Downtown Redmond in the summer of 2002. The inventory indicated that a total of 14,017 off-street, non-residential spaces existed in Downtown Redmond. In the previous summer, 2001, the City of Redmond counted about 1178 on-street parking spaces. This adds up to15,195 parking spaces available downtown, about 5000 of which are on the Town Center site. Table 1-3 indicates the distribution of parking for three types of businesses in the downtown area.

Currently approximately two-thirds of the available office parking is located in the Redmond Town Center area. The largest retail zones are located in the Redmond Town Center area and to the north end just south of 90th Street. The institutional category includes the library, all community centers, city government offices, all education centers, and auto body repair where very little customer and employee parking spaces were available

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	8,335	4,183	1,245	**13,763**
2000 Demand	3,773	2,633	943	**7,349**
2000 D/S Ratio	0.45	0.63	0.76	**0.53**
2030 Supply				**24,266**
2030 Demand				**14,018**
2030 D/S Ratio				**0.58**

During the current update of the Comprehensive Plan, employers and merchants have raised concern that the parking supply is inadequate for employees and customers. There are about 5,000 to 6,000 workers and less than 3,000 residents in the downtown area.[5] Currently, many private lots are marked "Only for use by customers of my business," which discourages visits to multiple stores. The ongoing *Downtown Redmond* study is considering four approaches to managing parking in the area. One option is to build a major structured public parking lot, which has the advantage of allowing a shopper or

[5] Comment taken from the Connecting Redmond Website (update of the Comprehensive Plan); Key Issues – Parking; (www.ci.redmond.wa.us/intheworks/mts/)

customer to park the car once and visit several places without moving the car. Another approach being considered is to increase parking requirements for new developments in order to meet peak demand. Parking management is also being examined; on-street parking near stores and businesses could be reserved for short visits (e.g. 2 to 4 hours) and employee parking located further from the businesses in common lots. Another improvement being considered is to add clear signage about the location of existing public parking and improving the pedestrian system so that walking 2 to 3 blocks to a variety of businesses is not so daunting.

All parking in the downtown study area is free. In addition, no permit parking exists, but most lots are restricted to either customers or employees, as noted previously. When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs from the PSRC/Trans-Lake Model

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$2.25
Carpool	$0.00	$0.33
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

The City of Redmond has produced a Redmond Bicycling Guide for the City that identifies higher traffic streets (generally with either wide shoulders, wide curb lanes or bike lanes); pedestrian paths; lower traffic streets (most are two lane streets with low speeds); off street paths; and uphill grades.

Marked crosswalks are located at most intersections within the downtown and at all signalized intersections. Crosswalks at signalized intersections have pedestrian signals including pedestrian walk/don't walk signals. Many of these signals require pedestrian activation by push buttons. The City recently adopted standards that do not allow mid-block crosswalks on arterials; the City is in the process of removing existing mid-block crossings or adding traffic signals at the crossings.

The city street standards require sidewalks on all new or reconstructed streets. The widths of the sidewalks vary depending on the classification of the street and type of land uses. In the downtown area the sidewalk network is nearly complete, with just a few unconnected links. For example, there are no sidewalks along the undeveloped land near 161st Ave NE and NE 83rd Street near the park-and-ride, but the rest of the sidewalk network is complete in this area.

Within the Downtown case study area, bike lanes (Class 2) exist on West Lake Sammamish between SR 520 and Marymoor Park, along Leary Way to W. Lake Sammamish from the intersection with the Sammamish River Park Trail. The Sammamish River Park Trail is a multi-use trail that originates in Marymoor Park and runs along the Sammamish River. This trail continues north of the City limits and eventually connects to the Burk-Gilman Trail north of Lake Washington. The Sammamish Trail is a Class 1 bicycle facility extending through the middle of the downtown area alongside the river. The City recently completed a detached Class 1 extension off the Sammamish Trail just south of and parallel to Leary Way. This trail, called the Bear Creek Trail, leads to the Redmond Town Center area.

Bicycle lanes (Class II) are also marked on the following east/west streets in the study area: NE 83rd Street, NE 85th Street, NE 95th Street. Marked lanes are on the following north/south streets: 160th Ave NE (to NE 90th Street) and on 161st Ave NE.

2.0 Population and Employment Characteristics

2.1 Population

As shown in Table 2-1, the downtown area is 0.8 sq miles with 1,397 residents; population is forecast to be three times larger by 2030. Much of this population growth is expected to come through infill development as opposed to greenfield development.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	0.80	
Population	1,397	3,965

2.2 Employment

The retail and office employment will both continue to increase; retail employment will double while the number of people engaged in office work downtown will nearly triple. In terms of jobs, this equates to an increase of over 20,000 people working in the downtown area in 2030 compared to the 8,500 people in 2001. Employment data from the PSRC/Trans-Lake model is shown in Table 2-2. Table 2-3 illustrates that the greatest numbers of businesses employ less than 50 people; the forecasts predict a similar situation in 2030. With so many employees belonging to small employers (<50 employees), any successful program in Downtown Redmond will need to be tailored to these users.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	3,363	6,103
Office	4,958	14,015
Other	258	190
Total	**8,579**	**20,308**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	5,743	1,456	1,381	0	8,579
2030	13,593	3,446	3,269	0	20,308

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table 2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the study area. Both the transit service and the density of Downtown Redmond are expected to go from medium/low to high in nearly all TAZs. The mix of uses is generally expected to stay at medium. Table 2-6 gives the

population, employment and trips by local area TAZ for the study area. These characteristics were summarized in earlier sections, and in general, they show a major increase in population and employment. Table 2-7 shows that in the future nearly all residents and workers will be better served by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
326	Medium 2	High 2	High	Medium	Low	Medium
327	Medium 2	Medium 1	Medium	Medium	Medium	High
328	High 2	High 1	High	Medium	Low	Low
329	Medium 2	High 2	Medium	Medium	Low	High
330	Medium 1	High 1	Medium	Medium	Low	Medium
331	High 2	High 1	High	High	Medium	High
333	High 2	High 1	Medium	Medium	High	High
334	Medium 1	High 1	Medium	Medium	Medium	High
335	High 2	High 1	Medium	Medium	High	High
336	High 2	High 1	Medium	Medium	Low	High
337	High 2	High 1	Medium	Medium	Low	High
338	High 2	High 1	High	Medium	Medium	High
339	High 2	High 1	Medium	Medium	Low	High
340	High 2	High 1	Medium	Medium	Low	High
341	High 2	High 1	Medium	Medium	Medium	High
342	High 2	High 1	Medium	Medium	Low	High
343	High 2	High 1	Medium	Medium	Medium	High
344	High 2	High 1	Medium	Medium	Low	Low
345	High 2	High 1	Medium	Medium	Medium	Medium
346	High 2	High 1	Medium	Medium	Low	High
347	High 2	High 1	Medium	Medium	Medium	High
348	High 2	High 1	Medium	Medium	Medium	High
349	High 2	High 1	Medium	Medium	High	High
350	High 2	High 1	Medium	Medium	Low	High
351	High 2	High 1	Medium	Medium	High	High
352	High 2	High 1	Medium	Medium	Low	Low
353	High 2	High 1	Medium	Medium	Medium	High
355	High 2	High 1	Medium	Medium	Low	High
356	Medium 1	High 1	Medium	Medium	Low	Medium
357	High 2	High 1	Medium	Low	Medium	High
358	High 2	High 1	Medium	Medium	Medium	High
359	Medium 1	High 1	Medium	Medium	Low	Medium
360	High 2	High 1	Medium	Medium	Medium	High
361	Medium 1	High 1	Medium	Medium	Low	Medium
362	High 2	High 1	Medium	Medium	Low	Low
364	High 2	High 1	Medium	Medium	Medium	Medium
365	Medium 1	High 1	Medium	Medium	Medium	Medium
366	Medium 1	High 1	Medium	Medium	Low	Low
369	High 2	High 1	Medium	Low	Medium	High
370	High 2	High 1	Medium	Medium	Medium	High

Table 2-6. Population, Employment and Trips

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail Employment		Other Employment		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
326	0.014	254	454	0	0	0	0	355	421	34	42
327	0.007	0	0	129	270	0	0	0	0	156	336
328	0.035	1	2	196	222	20	35	2	2	260	314
329	0.040	0	0	0	0	339	917	0	0	405	978
330	0.016	69	123	90	113	7	0	96	114	126	152
331	0.017	0	0	48	81	197	416	0	0	277	538
333	0.017	0	76	0	38	422	711	0	70	469	801
334	0.017	229	482	19	60	134	328	320	447	203	464
335	0.012	75	235	5	33	214	386	104	218	253	468
336	0.023	129	441	22	34	112	336	181	410	170	443
337	0.014	0	0	50	160	69	144	53	282	142	362
338	0.014	333	687	0	0	0	0	157	304	15	29
339	0.010	0	8	65	192	0	67	0	26	79	284
340	0.017	0	0	151	344	0	0	0	0	182	390
341	0.010	0	15	71	95	45	119	0	49	137	226
342	0.023	36	130	54	97	125	339	85	413	213	474
343	0.014	43	361	73	164	139	213	15	160	249	424
344	0.029	5	56	0	0	0	50	2	25	2	118
345	0.008	0	0	0	0	100	131	0	0	111	125
346	0.012	0	3	76	179	43	207	0	9	142	402
347	0.005	0	4	52	149	0	176	0	14	63	338
348	0.004	0	0	46	62	18	61	0	0	76	128
349	0.005	2	0	46	69	64	132	4	0	128	204
350	0.010	8	5	68	165	0	156	13	16	87	340
351	0.009	14	11	0	37	254	694	32	35	285	707
352	0.018	82	200	17	16	21	11	181	635	61	91
353	0.004	1	0	37	64	7	43	2	0	54	115
355	0.011	4	10	61	228	17	338	7	31	93	584
356	0.008	0	2	12	56	0	84	0	7	17	147
357	0.009	0	0	133	184	0	87	0	0	161	292
358	0.006	0	3	66	140	40	176	0	10	125	328
359	0.016	0	246	95	73	54	0	0	780	180	160
360	0.011	0	0	56	216	95	379	0	0	183	635
361	0.022	102	82	12	83	61	206	240	260	109	331
362	0.018	0	0	3	4	28	26	0	0	37	42
364	0.016	0	2	181	252	0	52	0	5	219	336
365	0.043	9	6	376	656	65	84	19	19	530	827
366	0.019	0	0	118	173	0	0	0	0	144	196
369	0.079	0	103	53	109	1,265	2,131	0	326	1,576	2,308
370	0.135	0	219	883	1,286	1,260	4,971	0	694	2,469	6,268

Table 2-7. Population Employment by Transit Service

		Transit Service Level						
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	Total
Transit Service	2000 Base	0	30	7	3	0	0	40
	2030 Base	37	2	1	0	0	0	40
Population	2000 Base	0	734	408	254	0	0	1,397
	2030 Base	3,511	454	0	0	0	0	3,965
Total Employment	2000 Base	0	7,067	1,044	468	0	0	8,579
	2030 Base	19,121	917	270	0	0	0	20,308

3.0 Travel Behavior Inventory

The following sections were developed from information contained in the Downtown Redmond Neighborhood Plan and the PSRC/Trans-Lake model.

3.1 Person and Vehicle Trips

The person and vehicle trips for the study are employees and residents are illustrated in Table 3-1. These were developed from information contained in the PSRC/Trans-Lake model. As with many of the case study areas, Downtown Redmond is expected to see a great increase in both person trips (142 percent) and vehicle trips (150 percent). However, the number of vehicle trips is not expected to increase as rapidly as the number of person trips due mostly to the significant increase in transit service that is forecast for the area.

Table 3-1. Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	10,220	21,746	7,273	16,081
Employed Residents	1,867	5,780	1,612	4,050

For existing conditions, approximately half of the trips into downtown during the PM peak have destinations in the downtown area. Trips enter downtown from many directions, more than many communities of similar size to Redmond. More than 52,000 people work in Redmond, according to the Greater Redmond Chamber of Commerce. Between residents and workers, the volume of motorists on the streets is strained. The Redmond Way-Cleveland couplet carries about 32,000 cars daily. Half of that traffic is downtown-bound; the other half is motorists passing through. Leary Way NE, which connects the downtown area to SR 520, has nearly 31,000 cars daily. The two lanes of 164th Avenue NE (SR 202) carry nearly 25,600 cars daily.

3.2 Average Vehicle Miles Traveled

The vehicle miles traveled to work in the Downtown Redmond are by employees is illustrated in Table 3-2. The number of miles by mode range from 15 to 19 miles; a small difference compared with many of the other case study area. The reason for the small distance of the measured vanpool users is unclear.

Table 3-2. Average Vehicle Miles Traveled by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	16
Carpool	19
Vanpool	17
Transit	15
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 2.2 percent of the PM Peak vehicle trips to and from Downtown Redmond cross the SR 520 Bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering Downtown Redmond use the bridge, although trips leaving the study area contribute a higher total number of vehicles to the bridge traffic. This is mainly the result of the fact that Downtown Redmond is a much larger employment center than residential hub. At 1,945, Downtown Redmond trips comprise 4.7 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	76,980	12,280	89,259
Study Area Trips Crossing SR 520 Bridge	1,049	896	1,945
Percent of Case Study Trips Crossing SR 520 Bridge	1.4%	7.3%	2.2%

3.4 Average Vehicle Occupancy for Commute Trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

In this study area, carpooling has been the mode of choice for those CTR employees that use alternatives to the SOV, as shown in Table 3-5.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	Carpool	Vanpool	Transit	Non-Motorized	Other
1993	3	87%	10%	0%	0%	2%	1%
1995	7	87%	11%	0%	0%	1%	0%
1997	10	83%	14%	1%	1%	1%	0%
1999	11	78%	19%	1%	0%	1%	0%
2001	14	80%	15%	3%	1%	1%	0%

4.0 History with TDM and Land Use Strategies

The Greater Redmond TMA is a private, not-for-profit Transportation Management Association that provides transportation services, commute trip reduction planning, and education to a consortium of major employers. The GRTMA has a current membership of 179, representing about 55,000 employees. Among the GRTMA's efforts is a comprehensive website with specific, detailed information on alternative commuting modes. In addition, the GRTMA operates Ridequest.com, a specialized ridematching service aimed specifically at commuters who work in Redmond. Redmond's R-Trip program, essentially a head tax on employers, generates revenue that goes back into TDM programs.

Redmond's city code requires all new commercial (office or industrial) developments over a certain trip generation threshold to implement TMPs. The TMP requirements are generally similar to requirements for CTR affected employers. Addendum A includes a description of the existing TMPs in Downtown Redmond.

Redmond's land use codes for Downtown also focus on creating a compact, mixed-use, pedestrian-friendly environment. Typical land use code requirements include direct pedestrian access and circulation (the City requires mid block connections or new public streets on a case-by-case basis in order to break up the street grid), pedestrian-oriented building entries, buildings that are built to the front lot line, covered walkways, bicycle facilities, and underground (or behind-the-building) parking. There is also a design review process in place for all projects in the City with the exception of single-family residential.

Table 4-1 lists the percent of Downtown Redmond employers who stated that they either did or did not offer a TDM program. The following table was developed using information from the Washington State CTR database.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	0%			
	No	100%			
Telecommuting	Yes	0%	14%	44%	55%
	No	100%	86%	56%	45%
Flex Time	Yes	0%	71%	89%	91%
	No	100%	29%	11%	9%
Guaranteed Ride Home	Yes	0%	0%	50%	73%
	No	100%	100%	50%	27%
Ridematching Services	Yes	33%	0%	56%	55%
	No	67%	100%	44%	45%
Shuttle Service	Yes	100%			
	No	0%			
Bike Subsidy	Yes	0%	0%		
	No	100%	100%		
Walking Subsidy	Yes	0%		0%	9%
	No	100%		100%	91%
Carpool Subsidy	Yes	0%		0%	18%
	No	100%		100%	82%
Vanpool Subsidy	Yes	0%		56%	55%
	No	100%		44%	45%
Transit Subsidy	Yes	0%	100%	44%	45%
	No	100%	0%	56%	55%
Ferry Subsidy	Yes	0%		11%	18%
	No	100%		89%	82%
Gen. Transportation Allowance	Yes	0%		33%	
	No	100%		67%	
Clothes Locker	Yes	100%		78%	82%
	No	0%		22%	18%
Uncovered Bicycle Parking	Yes	0%		67%	55%
	No	100%		33%	45%
Covered Bicycle Parking	Yes	100%		38%	55%
	No	0%		63%	45%
Passenger Loading Area	Yes	100%		0%	18%
	No	0%		100%	82%
Shower Facilities	Yes	0%		67%	73%
	No	100%		33%	27%

Addendum A.
Transportation Management Program Summaries

In Downtown Redmond there are currently two TMP programs: Redmond Town Center and the Lake Washington School District (LWSD). Details are provided in the following summaries.

Transportation Management Program – Redmond Town Center

The peak periods used in the TMP are the hours of 7:00 to 9:00 am and 4:00 to 6:00 pm, Monday through Friday. The program was implemented prior to the August 1997 opening of Redmond Town Center.

The goal was to enact measures to reach 30 percent employee participation in commuting to work in commuter modes other than SOV's during the am and pm peak hours within 2 years of opening.

The strategy

1. Designate carpool-parking stalls.
    - Preferential parking was signed for every existing car/vanpool along with three extra spaces until they reach 10 percent of employee parking spaces.
    - Preferential spaces will be reserved for registered carpool/vanpools from 6:00 am to 10 am Monday through Friday.
    - 'Registered' carpools/vanpools will be issued a decal, to be displayed in the vehicle being used.
    - Security officers of Town Center will monitor and enforce the use of these parking stalls.
2. Bicycles – Town Center buildings are to be equipped with bicycle parking facilities that meet or exceed demand. Additional parking equipment will be added as necessary.

The Incentives

Redmond Town Center will provide for incentives to reduce SOV trips—initial incentives considered were transit subsidies at a minimum value of 25 percent for two-zone transit riders, non-SOV commuter bonus or award plans of equivalent value and similar programs. The incentive plan was to be implemented within six months of opening of the Center.

Annual Program Review

A Program Review is to be completed annually, along with annual submittal of CTR report of tenants with over 100 employees to the City.

Annual Required Report: (September 10, 2001 Report). Reports a 31 percent employee participation in commuting to work in commuter modes other than SOV's during the am and pm peak hours (this included credit given for moving drive alone trips outside of peak hours). Redmond Towne Center shows 46 carpoolers; 32 who either walk or ride a bike to work; and 14 who ride the bus.

Note that merchant hours in the Towne Center are 10 am to 8 pm and fall outside of the peak hours. The largest tenant AT&T Wireless Service falls under the CTR program and reports specific data there. Neighboring businesses not under the Towne Center TMP include REI (17 employees use some form of

alternative transportation); as do ten employees of Lake Washington SD resource center; and one employee at the Marriott Hotel walks or rides a bike to work.

Lake Washington School District Resource Center

Located in the Town Center Development in Downtown Redmond, the school district TMP follows:

The goal –The one-year goal was to achieve and maintain a commute pattern (7 to 9 am; 4 to 6 pm) whereby at least 25 percent of the Lake Washington School District Resource Center employees commute to work in modes other than SOVs. The two-year goal was for 30 percent of employees to be included. (Initially 95 employees)

Implementation date – September 1997.

The strategy – To appoint a transportation coordinator to administer and promote the alternatives to SOV with the following:

- Establish a permanent transport information center with Metro ride match forms, bus schedules, bicycling information and other GRTMA information.
- Annually distribute forms and other GRTMA information to employees
- Provide guaranteed ride home for registered "rideshare" employees
- Provide nine preferential parking spaces for registered employee carpools in designated Resource Center parking areas (this represents 10 percent of parking spaces allotted to employee parking). The number of carpool spaces will be reviewed and revised at least annually.
- Provide a minimum of eight bicycle-parking racks, consistent with the ratio of .075 racks for each employee.
- Join the Greater Redmond Transportation Management Association (GRTMA)

Incentives

LWSD does not provide financial incentives to employees for rideshare programs; states this is against district policy.

Parking Charges

LWSD does not charge for parking,

Reporting

Conduct employee transportation surveys annually until goals are met, then biennially or as agreed upon with the City. Annually prepare a report on RCTMP activities, survey results and progress toward meeting the RCTMP goals.

Annual Required Report: (**Oct 26, 2001 Report**). Reports the building has 138 employees, 112 of which are employed full time year round. The CTR survey was distributed to 130 employees; 41 were returned for a 31 percent rate. (No information given on what the surveys revealed.)

Reports maintaining a transportation information center in the staff lounge; giving a brochure describing commute alternatives program to all new hires in the building; distributing GRTMA information to all employees; reserves seven carpool and vanpool spaces in parking lot; provides seven bicycle racks

located at the rear employee entrance, one at the rear visitor entrance and one at the front entrance for a total of nine bike racks; there are two showers and eight lockers to accommodate employees who bike, jog, or walk. In addition, the Resource Center participated in March 2000 and 2001 Smart Move Campaigns, Bike to Work Day in May, Summer Ridequest Campaign, Rideshare Week, and their own "One Day-Two for One" campaign in April. During the summer month, all year employees are given the opportunity to have a compressed workweek to work four ten-hour days. Not all employees choose to have the same day off.

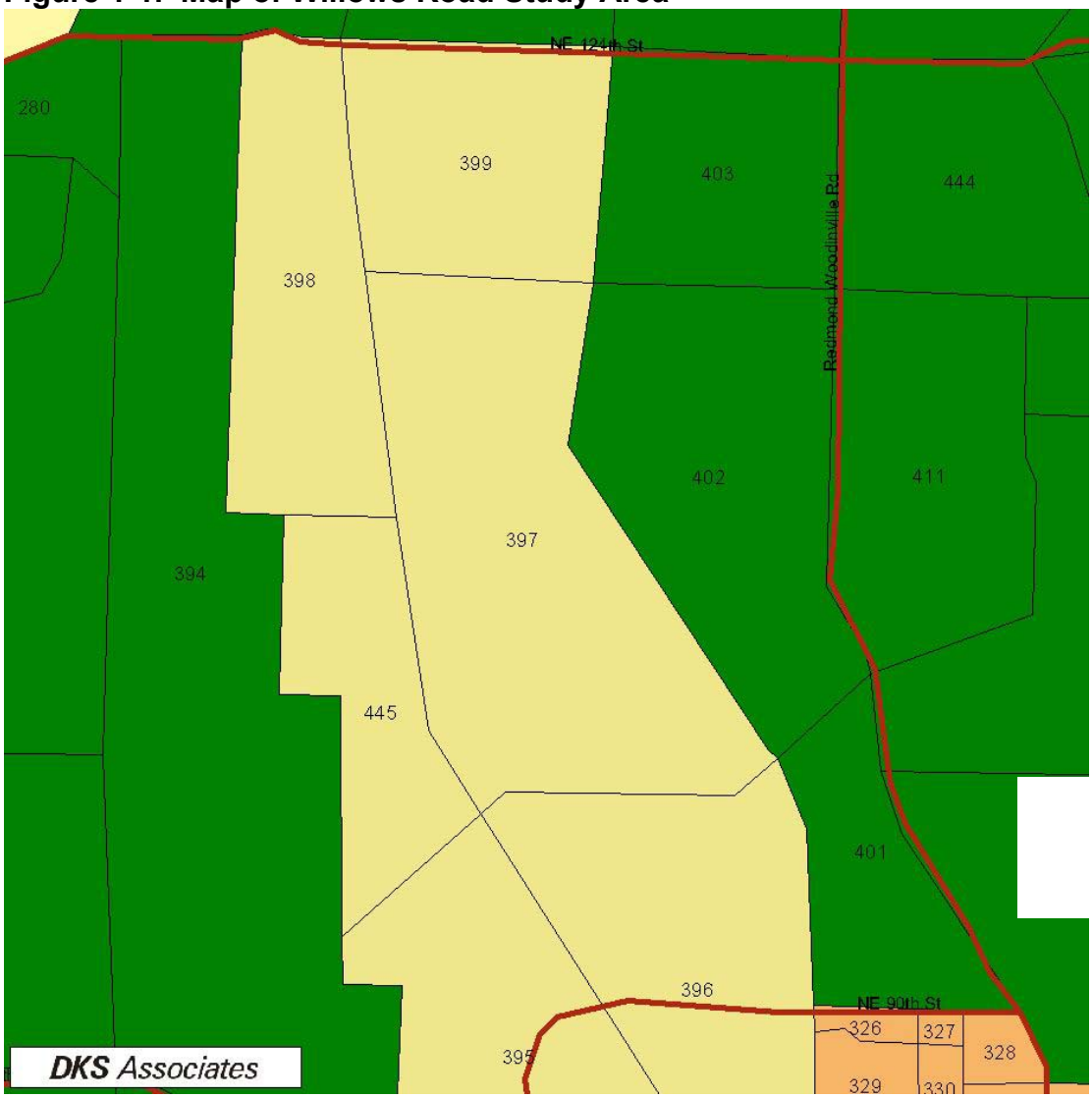
Willows Road - Redmond

1.0 Setting and Physical Characteristics

1.1 Location

The focus of this case study area is the Willows Road corridor in Redmond. It extends from downtown Redmond at the intersection of Willows Road with NE Redmond Way (SR 908) and goes north to NE 124th Street. Willows Road runs along the west side of the Sammamish Valley, which historically has been farmed. The valley area to the east of the roadway is subject to development limitations due to flooding, wetlands, seismic hazards, and ground water recharge. The Willows Road Corridor consists of small hills immediately west of Willows Road. High technology industries are located in this pastoral setting. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Map of Willows Road Study Area



1.2 Land Use Character and Mix

Manufacturing, research and development, light industrial, wholesaling and similar uses are encouraged on both sides of Willows Road south of the Puget Power right-of-way (located just north of NE 95th Street) and on the west side only to NE 124th Street. Most uses in the Willows Corridor consist of high technology industries. The business park portion permits retail and services only as part of building occupied by office or business uses.

The Willows Road corridor has sensitive areas that limit development of specific areas, including critical erosion hazards, landslide hazards, streams, wetlands and aquifer recharge areas along the road. Developments within the Willows Neighborhood which are north of the Puget Power right-of-way have to comply with stated design policies which include: (1) no more than 60 percent of the site may be covered by impervious surfaces; (2) pedestrian and bicycle links shall be provided to Willows Road; (3) new Business Park and residential development along Willows Road should use existing accesses or the streets in the Willows Road Neighborhood Street plan, rather than building new streets or accessways.

The land to the west of Willows Road is designated as a Research & Development/ High Technology /Manufacturing Park from NE 124th Street to the intersection with Redmond Way/NE 80th Street, the entire length of the corridor. The slopes immediately behind the business park remain forested. The land east and west of Willows Road from Redmond Way to NE 102nd is zoned manufacturing. The land to the east of Willows Road from NE 100th Street to NE 124th Street was changed to Urban Recreation and Open Space from previous designation of Agricultural in the 1995 comprehensive plan update. The Willows Road corridor is in the Willows/Rose Hill Neighborhood Plan that totals about 2.1 square miles, or a little over 10 percent of Redmond's land area. The neighborhood includes 2.2 million square feet of office, industrial, and retail space along the west side of Willows Road where about 5,200 people are employed.

1.3 Access to Freeways and State Facilities

NE 124th Street (and other east/west principal arterials) provides access from Willows Road to Interstate 405, located about a one mile to the west of and parallel to Willows Road. Access to SR 520 is reached at the southern terminus of Willows Road via SR 908 and West Lake Sammamish Parkway.

1.4 Roadway Network

The transportation elements of the City's 1995 Comprehensive Plan established a hierarchy of streets serving the City. This hierarchy is based on the desired function of the facility to serve local traffic, through traffic, or a combination of local and through traffic. The principal arterials provide access to/from the City and the freeways and connect activity centers. The minor arterials provide connections to the principal arterials and connections with higher density activity centers. These connections are supplemented with a system of collector arterials. The City's planned arterial system includes streets that are up to 5 lanes wide.

The principal arterials in the Willows area are the two roadways at the termini of both ends of Willows Road, NE 124th Street and NE Redmond Way (SR 908) and NE 90th. The only minor arterial is Willows Road. NE 116th Street that intersects Willows Road is classified as a collector by the City of Redmond.

1.5 Transit Services

1.5.1 Existing Transit Service

Route 291 provides the only service on Willows Road. There is but one bus route that provides service directly on Willows Road. Route 291 provides both fixed and (limited) variable routing, between the Redmond P&R and Kingsgate P&R. Route 291 provides 30 minute peak hour service on weekdays.

Passengers may wait at any bus stop along the route for regularly scheduled route trips. There are total of nine 30-minute headway fixed service routes each day; four in the morning during the peak period and five in the afternoon during part of the peak period. In the morning service from the Kingsgate P&R arrives at the north end of Willows Road and NE 124th at 6:07 am to 8:37 am and in the afternoon from 3:33 pm until 5:33 pm. In the other direction from the Redmond P&R, the first bus arrives at Willows NE and NE 124th at 6:55 am to 8:25 am; and from 3:31 pm 5:31 pm.

Additionally, reservations can be made at least two hours in advance, and one may make reservations for 30 days at a time up to 30 days in advance. Reservations are taken on a first-come, first-served basis. This service is provided in limited areas between Redmond Town Center and Lake Washington Technical College. Only a limited number of off-route deviations can be made on any given trip.

Passengers may be asked to board/deboard at a location a block or more from their origin or destination. On the west side of Willows Rd NE, service will deviate upon requires from the fixed routing in the northbound (to Kingsgate) direction only. The daily ridership was estimated at 98 in the Fall of 2001.

In addition, ST Route 540 (Bear Creek-Redmond P&R-U District Express) crosses Willows Road at NE 90th; allowing passengers on and off. Service is 30-minute headway from about 6 am to 9:30 pm (heading to Redmond); and from about 7 am to 10:15pm (heading to Kirkland and the UW). The route travels from Bear Creek P&R, to Redmond P&R, across Willows Road on to the Kirkland Transit Center, South Kirkland P&R, Evergreen Point Freeway Station, and onto the University of Washington campus. Other routes that cross through the area south of NE 90th, in the triangle piece of land area bounded by Willows Road, NE 90th, and the Sammamish River Slough, are as follows: #230, 232, 250, 253, 254, 266, 540, 545, and 546. Many of these routes travel on 154th Avenue NE and turn onto NE 80th St or NE 90th St. The daily ridership total is 409 for these routes.

1.5.2 Forecast for 2030 Transit Service

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. As Table 1-1 and Table 1-2 illustrate, the Willows road area is expected to get higher frequency bus service in the future, especially during the peak hours.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				21	**21**
	2030			13	5	**18**
Mid-Day	2000				21	**21**
	2030			9		**9**

Table 1-2. Frequency of Service

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				34	**34**
	2030			60	10	**70**
Mid-Day	2000				32	**32**
	2030			36		**36**

1.6 Parking Supply, Availability and Price

The Willows Road analysis area is dominated by light industrial and business parks located along the corridor and to the east. Outside of this area, the zone is predominantly residential homes, condominiums, and apartments. At the southern section of the study area, land use is more intense and businesses are more closely spaced. To the north, land uses include business parks, located in Zones 398 and 445 (west of Willows), while TAZ 397 consists of a golf course, and Zone 399 is in agricultural use at this time. All parking is free in the area.

Total off-street, non-residential parking capacity is 15,549 spaces. As shown in Table 1-3, the total weekday, mid-day demand was found to be 7,412 vehicles, or 48 percent.

The parking demand is the greatest in BKR[1] zone 398 (see Figure 1-1); this zone includes General Dynamics and Medtronic corporations. Several new buildings exist in the industrial parks that were

[1] Bellevue-Kirkland-Redmond Model

vacant at the time of the survey. In addition, vacant offices existed inside the industrial parks where the parking allotted to the vacant buildings could not be differentiated from the occupied buildings' parking.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	175	13,464	1,910	**15,549**
2000 Demand	54	6,986	372	**7,412**
2000 D/S Ratio	0.31	0.52	0.19	**0.48**
2030 Supply				**18,958**
2030 Demand				**11,948**
2030 D/S Ratio				**0.63**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs from the PSRC/Trans-Lake Model

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$1.12
Carpool	$0.00	$0.67
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

There are bike lanes (class II) along Willows Road from NE 95th to NE 116th. There are lanes planned from NE 116th to NE 124th Avenue. On the City's Bike Map, the stretch of Willows Road from NE 95th to Redmond Way is identified as a road to use with caution. The high traffic and turning movements on Willows Road, especially at peak times, is not favorable to cycling activity.

Sidewalks are located along portions of Willows Road; along other portions pedestrians must walk along the shoulder which varies in width and condition. Signalized crosswalks are located only at the traffic lights At NE 116th Avenue and NE 95th Avenue.

At recent neighborhood plan meetings, those who work in the Willows Road Business Corridor expressed concern about inadequate pedestrian safety. Initial suggestions included constructing additional sidewalks along Redmond Way and crosswalks along Willows Road. As mentioned, currently cross walks across Willows Road are located only at the intersections with signal lights. However, the City of Redmond recently adopted standards that there will be no mid block crossings on arterials.

The City of Redmond's Park, Recreational and Open Space (PRO) plan identifies four proposed trails within the Willows/Rose Hill neighborhood: a north-south trail along the Puget Sound Energy corridor, an extension of the east-west PSE/City of Redmond trail from Willows Road to 132nd Avenue NE, a

new trail from the PSE corridor east along NE 124th Ave NE, and a trail along the railroad. The PRO plan was updated in 1997 and is updated every five years.

2.0 Population and Employment Characteristics

The following tables provide more information about population and employment characteristics.

2.1 Population

The size and population for both 2000 and 2030 of the study are is given in Table 2-1. The population is expected to drop over the next thirty years, as housing development will occur primarily in other parts of the county. Most of the growth in the Willows corridor will be in employment.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	2.14	
Population	2,175	1,891

2.2 Employment

The main types of employment in the study area are in office and manufacturing. As shown in Table 2-2, retail is expected to decline (although it is only a small part of the total employment) while office employment increases by more than 4,000 in the next thirty years. For the study, firms were divided into four groups as shown in Table 2-3. This pattern is forecasted to continue in 2030. The growth into the future is expected to be occurring in all size employers.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	185	71
Office	5,583	9,918
Other	6,832	7,329
Total	**12,600**	**17,318**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	4,115	1,746	3,396	3,343	12,600
2030	5,656	2,399	4,667	4,595	17,318

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table 2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the study area. The zones that currently get high transit service are the zones that border Downtown Redmond, where transit service is much greater than in the Willows Road corridor. Given the present and future emphasis of light industrial and office uses in the area, the mix of uses in the area remains low. Table 2-6 gives the

population, employment and trips by local area TAZ for the study area. These characteristics were summarized in earlier sections. In general, they show a declining population in most zones, with increasing "other" employment leading to more attraction trips. Table 2-7 shows future population and employment by transit level of service. In the future, more resident and employee trips are expected to be in zones with high transit service.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
395	High 2	High 1	Low	Low	Low	Low
396	High 2	High 1	Low	Low	Medium	Medium
397	Low 1	Medium 2	Low	Low	Low	Low
398	Low 1	Medium 2	Low	Low	Low	Medium
399	Low 1	Low 1	Low	Low	Low	Low
445	Low 1	Low 1	Low	Low	Medium	High

Table 2-6. Population, Employment and Trips

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail Employment		Other Employment		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
395	0.403	1,883	1,382	59	71	1,703	1,924	1,651	1,982	2,222	2,545
396	0.424	284	507	126	0	5,768	6,465	397	470	7,026	8,958
397	0.566	0	0	0	0	64	67	0	0	179	228
398	0.284	9	0	0	0	1,970	4,637	6	0	2,279	4,947
399	0.263	0	3	0	0	0	0	0	2	0	0
445	0.196	0	0	0	0	2,910	4,153	0	0	3,292	4,238

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	2	0	0	4	0	6
	2030 Base	2	0	0	2	2	0	6
Population	2000 Base	0	2,167	0	0	9	0	2,175
	2030 Base	1,888	0	0	0	3	0	1,891
Total Employment	2000 Base	0	7,656	0	0	4,944	0	12,600
	2030 Base	8,460	0	0	4,705	4,153	0	17,318

3.0 Travel Behavior Inventory

The data in this section provides information about travel behavior in the study area.

Some background information is presented below:

- The PM peak hour trip traffic on Willows Road, traveling northbound, picks up a number of pass through vehicles at NE 90th Street as follows: 1880 vehicles enter at Redmond Way intersection with Willows Road; just north of the intersection with NE 90th Street 2811 vehicles travel north; north of NE 116th Street 3898 vehicles travel to intersection with NE 124th Street.
- The average daily traffic (ADT) volume on Willows Road at NE 116th Street is approximately 11,100 northbound and 10,799 southbound. Near the intersection with NE 90th Street, more than 27,000 the ADT is 13,987 northbound and 13,181 southbound.
- Roadway Connectivity is an issue in this area. Willows Road connects to only five roads including: e/w on NE 124th Street, east only on NE 116th Street, east only on NE 95th Street, e/w on NE 90th Street, and e/w on Redmond Way.
- Over the years, discussions have been held on extending NE 100th or NE 104th Street west from Willows Road to 132nd Avenue NE. The residents of NE Rose Hill have traditionally opposed this idea. Redmond's City Council voted to eliminate extension of NE 100th Street from the Transportation Facility Plan when they adopted the City's Comprehensive Plan in 1995. At this time of this report, the City of Redmond[2] has no plans to construct this street extension.

3.1 Person and Vehicle Trips

The person and vehicle trips for the study area employees and residents are illustrated in Table 3-1 (from the TEEM model). The area is expected to see an increase of 6,000 person trips, but an increase of only 4,000 vehicle trips.

Table 3-1. Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	14,998	20,917	13,339	17,278
Employed Residents	2,053	2,454	1,830	1,785

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work in Willows Road by employees is illustrated in Table 3-2. As would be expected, users of vanpools drive the farthest. This illustrates the commonly assumed condition that people who live farther away from work are more willing to use a vanpool.

[2] The Rose Hill/Willows Neighborhood Plan

Table 3-2. Average Vehicle Miles Traveled by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	19
Vanpool	25
Transit	18
Non-Motorized	0

3.3 SR 520 Corridor Trips

Just over 1.2 percent of the PM Peak vehicle trips to and from Willows Road cross the SR 520 bridge. As shown in Table 3-3, a much higher percentage of vehicle trips heading to Willows Road use the bridge. At 529, Willows Road trips comprise 1.3 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	37,572	5,478	43,050
Study Area Trips Crossing SR 520 Bridge	237	291	529
Percent of Case Study Trips Crossing SR 520 Bridge	0.6%	5.3%	1.2%

3.4 Average Vehicle Occupancy for Commute Trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Corridor Related Vehicle Trips

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

The vehicle miles traveled to work by employees in the Willows Road corridor is illustrated in Table 3-5. Users of carpools have increased from 10 percent to 15 percent over the past 8 years.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	Carpool	Vanpool	Transit	Non-Motorized	Other
1993	6	87%	10%	1%	0%	1%	0%
1995	8	83%	13%	2%	1%	1%	0%
1997	11	83%	13%	2%	0%	2%	1%
1999	13	83%	11%	3%	1%	1%	1%
2001	14	80%	15%	2%	1%	1%	0%

4.0 History with TDM and Land Use Strategies

Using information from the Washington State CTR data base, the following tables were developed for the case studies.

Table 4-1 lists the percent of Willows Road employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	100%	100%	0%	0%
	No	0%	0%	100%	100%
Telecommuting	Yes	67%	38%	30%	50%
	No	33%	63%	70%	50%
Flex Time	Yes	100%	88%	80%	81%
	No	0%	13%	20%	19%
Guaranteed Ride Home	Yes	33%	13%	89%	88%
	No	67%	88%	11%	13%
Ridematching Services	Yes	20%	13%	44%	69%
	No	80%	88%	56%	31%
Shuttle Service	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Bike Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Walking Subsidy	Yes	0%	0%	38%	40%
	No	100%	100%	63%	60%
Carpool Subsidy	Yes	0%	100%	33%	38%
	No	100%	0%	67%	63%
Vanpool Subsidy	Yes	100%	100%	56%	81%
	No	0%	0%	44%	19%
Transit Subsidy	Yes	100%	100%	56%	75%
	No	0%	0%	44%	25%
Ferry Subsidy	Yes	0%	0%	22%	19%
	No	100%	100%	78%	81%
Gen. Transportation Allowance	Yes	0%	0%	17%	56%
	No	100%	100%	83%	44%
Clothes Locker	Yes	0%	0%	78%	81%
	No	100%	100%	22%	19%
Uncovered Bicycle Parking	Yes	0%	0%	44%	56%
	No	100%	100%	56%	44%
Covered Bicycle Parking	Yes	100%	0%	67%	75%
	No	0%	100%	33%	25%
Passenger Loading Area	Yes	0%	100%	44%	44%
	No	100%	0%	56%	56%
Shower Facilities	Yes	0%	0%	89%	94%
	No	100%	100%	11%	6%

The Greater Redmond TMA is a private, not-for-profit Transportation Management Association that provides transportation services, commute trip reduction planning, and education to a consortium of major employers. The GRTMA has a current membership of 179, representing about 55,000 employees. Among the GRTMA's efforts is a comprehensive website with specific, detailed information on alternative commuting modes. In addition, the GRTMA operates Ridequest.com, a specialized ridematching service aimed specifically at commuters who work in Redmond.

Redmond's R-Trip program, essentially a head tax on employers, generates revenue that goes back into TDM programs.

Redmond's city code requires all new commercial (office or industrial) developments over a certain trip generation threshold are required to implement TMPs. The TMP requirements are generally similar to requirements for CTR affected employers.

Addendum A reviews the existing TMP's in the Willows Road study area.

Addendum A
TMP Summaries

Building TMP Programs

In Willows Road there are six TMP programs, two of these are summarized in the following paragraphs to present the general contents of the programs.

CarrAmerica-Willows Creek Business Campus

The peak periods used in the TMP are the hours of 7:00 to 9:00 am and 4:00 to 6:00 pm, Monday through Friday. The goal is to enact measures to reach 30% employee participation in commuting to work in commuter modes other than SOV's during the am and pm peak hours within 2 years of 70 percent occupancy. The terms and conditions of the TDM plan transfer with the property and are binding upon any subsequent owner of the property. Specific strategies/actions include:

- Membership in the Greater Redmond TMA
- Establish a ride-matching system
- Establish preferential parking for carpools and vanpools near employee entrances to building on the CarrAmerica site. Only "registered" carpools/vanpools will be allowed to park in these stalls. Register with the Transportation Coordinator who will pass out decals. Parking spaces are reserved from 6 am to 9 am and from 1:30 am to 1:30 pm Monday through Friday. At least 10 percent of the total spaces for vanpools/carpool parking.
- The CarrAmerica Buildings will be equipped with bicycle parking facilities that meet or exceed demand.
- Carr America will provide for one annual event to focus on transportation issues.
- CarrAmerica will issue a minimum $10 subsidy to reduce the cost of monthly transit passes
- CarrAmerica will encourage users to participate in the planned two-year shuttle program that will provide service within walking distance of the buildings. CarrAmerica's two-year contribution is $125,000 for this program.

Annual Program Review

Progress towards the goals of the TMP will be reviewed and reported annually. A report will be submitted to the City of Redmond yearly.

In the event that the stated goal of 30 percent reduction of all single occupancy vehicles is not achieved by the fourth year of 70 percent occupancy.

Annual Required Report (January 30, 2002)

The report summarizes the items listed in the plan. There is no information about the number of people using the carpools/vanpools spaces or alternative modes to commute to work.

Willows Commerce Park Phase 3

There are two buildings covered with this agreement. Building D is an office/warehouse building. Building E is a three-story office building. (Are these built of not). The peak hours are defined from 6am to 9 am and from 4 pm to 6 pm. The goal of the TMP is within one year of implementation, maintain a commute pattern during substantial occupancy (when at least 70 percent of building floor area is leased and used by tenants), where 30 percent of the employees commute using other than an SOV during the peak hours. Implementation will begin when there are at least 25 tenant employees onsite. The strategies and actions are as follows:

- Appoint a site Transportation Coordinator to conduct these activities and promote the program
- Annual Special Transportation Day
- Establish a permanent Commuter Information Center
- Establish a ride-matching service
- Establish preferential parking for carpools and vanpools near employee entrances to building on the WCP3 site. Only "registered" carpools/vanpools will be allowed to park in these stalls. Register with the Transportation Coordinator who will pass out decals. Parking spaces are protected for carpool and vanpool use only during AM and PM peak hours and lunch hours Monday through Friday. Visitors may use the preferential spaces at other times. The initial number of spaces will be at least two in front of each tenant with 50 or more employees, and one in front of each tenant with less than 50. As these spaces are assigned, additional spaces of up to 10 percent of the total employee spaces will be marked for vanpools/carpool parking.
- Bicycle racks will be provided; at least one per 50 employees
- A financial contribution to the Shuttle Bus system in the amount of $66,528 will be made when implementation of this TMP begins
- Retain membership in the Greater Redmond TMA
- Contribute $20,000 annually for ten years to a fund to be used for a "Commuter Club" to be established by Metro or the STC. The program will provide points tradable for vouchers which are redeemable at participating retail stores.

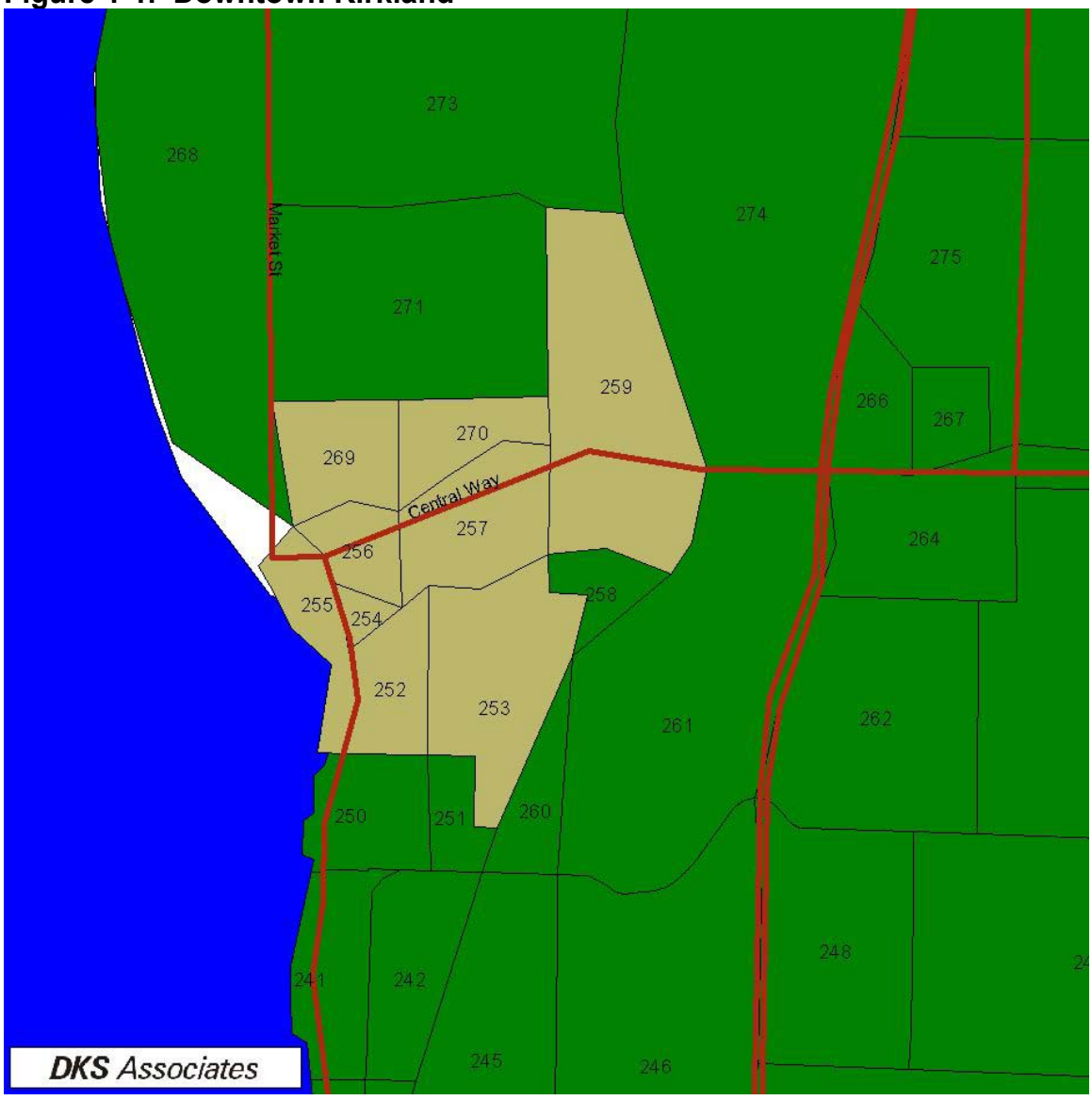
Downtown Kirkland

1.0 Setting and Physical Characteristics

1.1 Location

This section summarizes the characteristics Kirkland's downtown area, an older, medium-density suburban downtown near the eastern base of the SR 520 Bridge on the Lake Washington waterfront. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Downtown Kirkland



1.2 Land Use Character and Mix

According to the City of Kirkland Comprehensive Plan, downtown Kirkland's role is a regional activity area, a community and regional center for professional and government services, and a corporate headquarters. The area also provides specialty retailing, a center for tourism and the arts, goods and services for neighborhood residents, and a connection to the waterfront.

Kirkland's downtown is largely commercial and medium/high density residential, with some office space. Peter Kirk Park alongside Central Way NE in the heart of downtown, is a large area of open space, and there are public spaces provided along the waterfront parks.

1.3 Access to Freeways and State Facilities

I-405 lies just to the east of downtown Kirkland, while SR 520 is one mile south of the downtown area.

I-405. The I-405 corridor runs north-south through Kirkland 1 mile to the east of the downtown area, and continues north to pass through the Totem Lake neighborhood.

SR 520. The SR 520 freeway can be accessed from downtown Kirkland either via I-405, or via southbound Lake Washington Blvd NE, which has ramps to SR 520.

1.4 Roadway Network

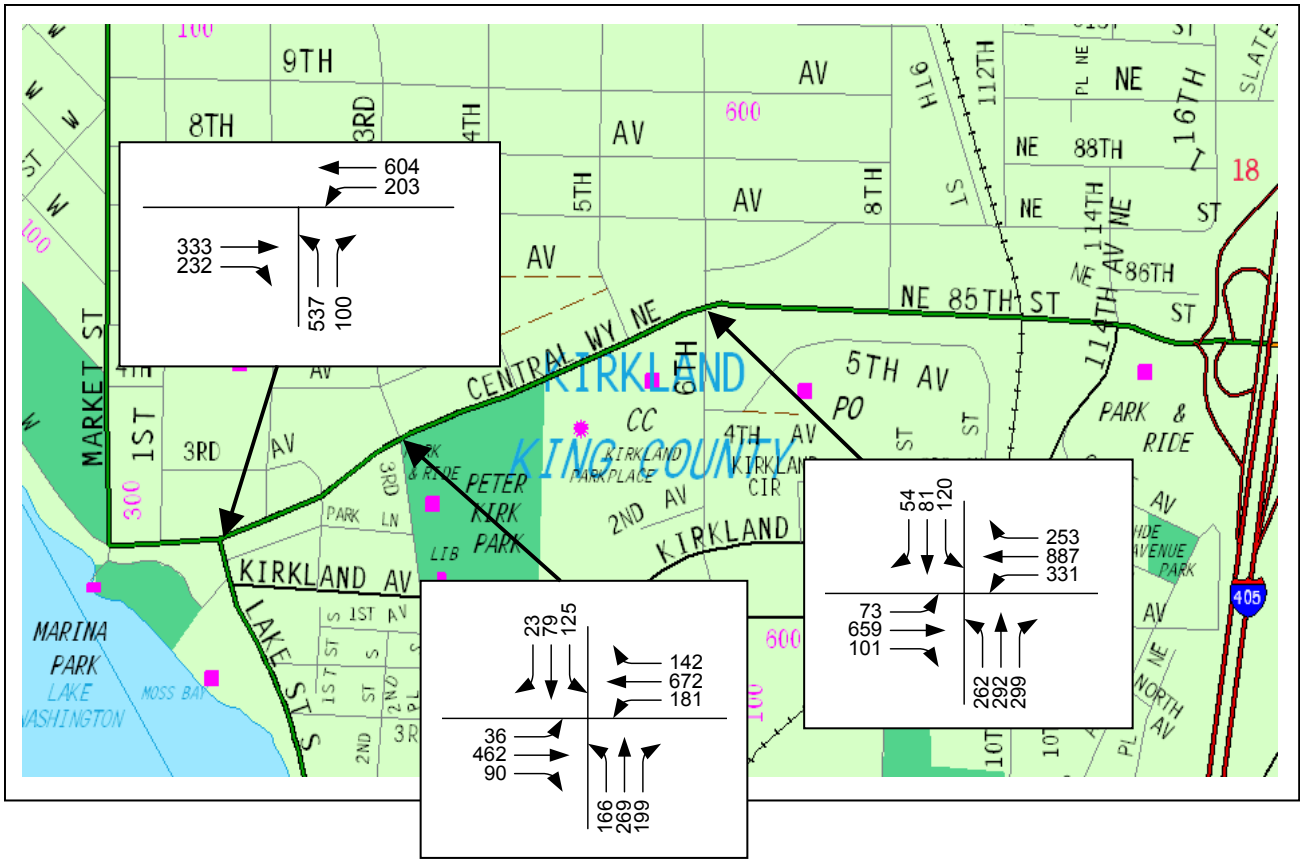
In the downtown area, Central Way NE, Market Street, and Lake Washington Boulevard/ Lake Street represent the principal arterials and most important segments of the roadway network for travel in the downtown area. Central Way NE, which runs east-west, becomes NE 85th Street/SR 908 to the east, and provides access between downtown and I-405. Lake Street S./Lake Washington Blvd to the south, provides access to SR520 and downtown Bellevue. Market Street provides the main north-south access to and from Kenmore/Bothell and SR 522 through the Juanita area.

The minor arterials provide connections between principal arterials, also serving as key circulation routes within Kirkland. The only minor arterial in downtown Kirkland is 6th Street S. that connects Central Way to NE 68th Street to the south.

Collectors distribute traffic from arterials to local streets. In the downtown area the collectors include Kirkland Avenue/Kirkland Way, 2nd Ave S., State Street, Railroad, and 7th Avenue.

Central Way between Market Street and 6th Street carries about 18,000 to 30,000 vehicles per day. The traffic volumes are substantially higher in the east section east of 6th Street than the sections west of 6th Street. The section east of 6th Street is an access route to/from I-405. The sections of Central Way between Market Street and 6th Street are carrying traffic in a range of 18,000 to 20,000 vehicles per day. The westbound lanes of Central Way between 3rd Street and 6th Street carry higher volumes. Local intersection volumes from 1998 are summarized in Figure 1-2.

Figure 1-2. Existing PM Peak Hour Traffic Counts in Downtown Kirkland (1999)



Source: Kirkland Downtown Plan, 1999

1.5 Transit Services

1.5.1 Existing Transit Service

The existing and future transit service levels are discussed in the following sections.

Route 230 services Kingsgate P&R, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, and the downtown Redmond P&R. This route operates seven days a week and has an AM peak hour headway of 30 minutes, with peak hour headways of 15 minutes between Kirkland and Bellevue.

Route 234 services Northshore P&R, Kenmore, Finn Hill, Juanita, Kirkland Transit Center, Northwest College, S. Kirkland P&R, 116th Ave NE, and the Bellevue Transit Center. This route operates weekdays and on Saturday with an AM peak hour 30 minute headway on weekdays.

Route 236 services Kirkland Transit Center, Kirkland, Juanita, Totem Lake, Kingsgate, Brickyard P&R, Bothell, and the Woodinville P&R. This route operates weekdays and on Saturday with an AM peak hour 30-minute headway on weekdays.

Route 238 services Kirkland Transit Center, Kirkland, Rose Hill, Lake Washington Technical College, Totem Lake, Kingsgate P&R, Finn Hill, Brickyard P&R, Bothell P&R, UW Bothell Campus, and

Cascadia Community College. This route operates seven days a week, with 25 minute headways in the AM peak hour.

Route 245 services Kirkland, Houghton P&R, Redmond, Overlake, Bellevue, Eastgate P&R, and Factoria. This route operates seven days a week, with 30 minute headways in the AM peak hour.

Route 251 services Kirkland Transit Center, Houghton P&R, Redmond P&R, Bear Creek P&R, Cottage Lake, Woodinville P&R, Bothell, UW Bothell Campus. This route operates weekdays and Saturdays, with a 30 minute headway on the weekdays AM peak hour.

Route 254 services Kirkland Transit Center, Houghton P&R, Redmond P&R, Education Hill. This route operates seven days a week, with a 50 minute weekday AM peak hour headway.

Route 255 services Brickyard P&R, Kingsgate P&R, Kingsgate, Juanita, Kirkland Transit Center, Northwest College, South Kirkland P&R, Montlake, and the Downtown Seattle (tunnel). This route operates seven days a week with 10 minute headways weekday AM peak hour (downtown Kirkland) and 30 minute headways at Totem Lake.

Route ST 540 services the Bear Creek P&R, Redmond P&R, NE 85th St, Kirkland Transit Center, Northwest College, South Kirkland P&R, SR-520 Freeway stops, and the University District. This route operates seven days a week, with 15 minute headways in the AM peak hour.

The Kirkland Transit Center is the focal point for transit service in the downtown Kirkland area. The transit center is located at 3rd Street and Park Lane. It is an on-street facility, with standard bus shelters. Eight Metro bus routes and one Sound Transit route use the facility (Metro 230, 234, 236, 238, 245, 251, 254, 255 and ST 540). No parking is available at the transit center. There are currently four bays at the Kirkland Transit Center, located at the four corners of the intersection. Crosswalks at Park Lane link the four bus bays. Sound Transit is currently designing a new Kirkland Transit Center. At publication time, the preferred site is at an off-street location on Kirkland Way between 3rd and 6th Streets. Eight bays are planned and construction is to be completed by 2005.

The Kirkland Transit Study[1] reports that during peak periods (generally 6 to 9 am and 3 to 7 pm weekdays), buses get delayed in general traffic, which makes timed connections difficult to achieve on a consistent basis. There are close groupings of arrivals and departures and no built-in recovery times.

Eight Metro bus routes serve the Kirkland transit center and for five of those routes the center is the terminus –for the 236, 238, 245, 251, and the 254. Transit service connects downtown Kirkland to other parts of Kirkland, such as Totem Lake and to other eastside employment and urban centers including Woodinville, downtown Bellevue, the Overlake area, Microsoft, and downtown Redmond; the routes use principal arterials, not the freeways. The one express route, Sound Transit 540, travels between the University of Washington and Redmond, with 30-minute headways from 6:30 am to 10 pm. Route 255 offers direct service to downtown Seattle. Regional destinations south of Kirkland are reached via transfer at Bellevue. Destinations to the north such as Lynnwood and Everett are reached through connections at I-405 via the Houghton or Kingsgate Transit Centers.

Some High Occupancy Vehicle (HOV) priority treatments are provided in the Kirkland area. These treatments increase transit reliability and reduce travel time for the transit routes, which operate on the

[1] KJF Associates and LRS and Associates, March 1999.

corridors with treatments. HOV lanes are provided on the inside lanes on I-405 through the City of Kirkland in both the northbound and the southbound directions.

Ramp metering and queue bypass lanes at interchanges in Kirkland also facilitate transit service reliability and increased travel times. The queue bypasses located in the downtown Kirkland study area are at:

- NE 70th Street/ I-405 Interchange: northbound/southbound on-ramps
- NE 85th Street/ I-405 Interchange: a portion of the northbound/southbound on-ramps

1.5.2 Forecast for 2030 Transit Service

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Plans are in place to upgrade and expand the transit center in downtown Kirkland, supply more bus bays and amenities, and enhance transit service. Plans are also being developed to make street and signal improvements on the NE 85th Street and NE 108th Street corridors to prioritize transit, thus improving bus service.[2] Table 1-1 and Table 1-2 show the forecasted changes in service for 2030.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				12	**12**
	2030			11	1	**12**
Mid-Day	2000				26	**26**
	2030			9		**9**

Table 1-2. Frequency of Service

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				16	**16**
	2030			50	1	**51**
Mid-Day	2000				35	**35**
	2030			36		**36**

1.6 Parking Supply, Availability and Price

The Downtown Kirkland study area covers a relatively large area. A significant portion of the north end and south end of the study area is residential, and thus was excluded from the parking inventory performed as part of data collection for TEEM[3].

A large supply of on-street parking is available in downtown Kirkland, which was observed to be well used. However, only off-street parking was included in the study. Table 1-3 shows the off-street parking supply and demand. Institutional land uses include an elementary school, the Kirkland Post Office, the Library, and churches. Some light industrial activity is located in the eastern portion of the study area near the railroad tracks and is categorized as 'other'.

[2] Sound Transit Website; http://soundtransit.org/stexpress
[3] Parking Study, Mirai Associates 2002.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	**Office**	**Other**	**Total**
2000 Supply	1,746	2,229	431	**4,406**
2000 Demand	1,019	1,205	221	**2,445**
2000 D/S Ratio	0.58	0.54	0.51	**0.55**
2030 Supply				**5,216**
2030 Demand				**3,036**
2030 D/S Ratio				**0.58**

1.6.1 Average Cost of Parking for Employees that Drive to Work

Public parking is available in several locations in Downtown Kirkland. Free two-hour parking is available at the Marina Park lot, the Lake Street lot, the Central Street lot, as well as on-street parking in the downtown core that provides access to retail businesses. Free four-hour parking is provided at the Municipal Parking Garage, located under the Kirkland Library, at the corner of 3rd Street and Kirkland Avenue.

In addition, all-day parking is available in the Municipal Garage for a $5 fee, and metered parking is provided in six spaces in the Lake Street lot and in four spaces at the Marina Park lot for $1 per hour. Private parking lots also provide customer parking in the downtown CBD.

The Municipal Garage at the Kirkland Library was partly financed by the city's in-lieu of parking fee program. The businesses and developments in the downtown contributed funds to the program instead of supplying their own parking spaces. In addition, the Park Smart program allows employees working downtown to obtain a parking permit for the Municipal Garage. The Park Smart program also provides monthly paid parking in the Marina lot, Main Street lot, and the parking area adjacent to Marina Heights. It appears that the Park Smart program has been well received by the downtown employees.

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs from the PSRC/Trans-Lake Model

	Parking Costs	
	2000	**2030**
Drive Alone	$0.00	$0.00
Carpool	$0.00	$0.00
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

Kirkland has been an innovator in improvements that improve the quality of the pedestrian experience downtown: high-visibility flashing crosswalks, public art, a lively streetscape, and an extensive sidewalk network.

Over the years, the city has provided sidewalk connections along Park Lane and through Peter Kirk Park past the Library, ball field, and the Kirkland Performing Arts Center, making the downtown sidewalk network almost 100% complete. With the basic pedestrian infrastructure in place, downtown Kirkland can focus on the quality of the pedestrian experience.

Striped bicycle lanes in downtown Kirkland are located on the roadways of State Street and Market Street.

The City of Kirkland adopted a Non-Motorized Transportation Plan in 1995, and updated it in 2001. It established a long-term future vision of Kirkland regarding pedestrian and bicycle circulation and identified general actions that the City should undertake to provide for a more comprehensive non-motorized system.

Planned improvements by 2030 include the following list of the locations where pedestrian facility improvements were identified in the plan for the downtown area:

- Waverly Way Bluff Linear Park Trail (West Side)
- Central Way between Market Street and 6th Street
- Existing section of Shorefront Walkway between Market Street and Yarrow Bay
- Market Street north of Marina Park
- 7th Avenue between Market Street and 6th Street
- 2nd Street between 7th Avenue and Central Way
- 3rd Street between 7th Avenue and Central Way
- 4th Street between 7th Avenue and Central Way
- Pedestrian path between Lake Street following Park Lane, Peter Kirk Park, 4th Avenue to NE 80th
- Kirkland Way from Lake Street to BNRR
- State Street between Kirkland Avenue and NE 68th Place
- Lake Street between Central Way and 2nd Street South

The City's Non-Motorized Transportation Plan also identifies several bicycle routes where facilities to support bicycle transportation are needed. In the downtown area, the designated bike routes are: Market Street north of Central Way, a short section of Central Way between Market Street and Lake Street, a short section of Lake Street between Central Way and Kirkland Avenue, Kirkland Avenue, State Street/ 3rd Avenue South, and 3rd Street between Central Way and 7th Street. NE 80th Street is a bicycle corridor as is Lake Washington Boulevard.

2.0 Population and Employment Characteristics

The size and population for both 2000 and 2030 of the case study area is given in Table 2-1.

2.1 Population

The population of Downtown Kirkland is expected to increase by 2,000 people over the next 30 years. The City of Kirkland has experienced a 1.4 percent annual population growth rate since 1990.[4] However, the population grew by nearly 20 percent within a mile of Downtown area from 1980 to 1990, and grew another 12 percent from 1990 to 2000. According to projections, nearly a quarter of the projected population of the entire City will be living within one mile of Downtown by 2004 or 2005.

[4] Downtown Kirkland Memo for Strategic Plan; the Leland Consulting Group 1999.

Residential density in Kirkland is highest in the Downtown and Totem Lake areas, with 13.6 units per acre in the Central neighborhood, which includes Downtown. Although the Central neighborhood still includes a small percentage of single-family units, from 1990 to 1999, there was high growth in condominium development in the downtown area, which added an estimated 793 units to the one-mile area.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	0.63	
Population	4,516	6,760

The average household income in Kirkland increased 49.6 percent from 1989 to 1998 (from $49,119 to $73, 506) and is expected to reach $99,053 by 2004.[5] This is above average even for the relatively well-off Puget Sound region, where average household income was $61,151 in 1998. The majority of households in both Kirkland (as well as the Eastside as a whole) have household incomes over $50,000.

2.2 Employment

Within the downtown Business District, the types of employment reflect the fact that the downtown area is a shopping and eating destination for Eastside residents.[6] Over 80 percent of Downtown Kirkland employees work in one of three major business sectors (restaurants, professional or retail) as shown in Table 2-2 and Table 2-3. Over the next thirty years, employment is expected to increase little.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	1,556	1,586
Office	2,466	2,858
Other	246	202
Total	**4,267**	**4,647**

Most employees work for small businesses with fewer than 50 employees; this is expected to remain the pattern.

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	2,386	884	997	0	4,267
2030	2,598	963	1,085	0	4,647

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the Downtown Kirkland Area. In every zone, the transit service is expected to increase substantially to a High 1. The mixed use and the density are more mixed. Table 2-6 gives the population, employment and trips by

[5] Ibid
[6] Ibid

local area TAZ for the study area. The summary of these characteristics was described in earlier sections. In general, the population is increasing in the Downtown Kirkland Zones, while the employment is more mixed. Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
252	Medium 1	High 1	High	High	Low	Low
253	Medium 1	High 1	High	High	Low	Medium
254	Medium 1	High 1	High	High	High	High
255	Medium 1	High 1	High	High	High	Medium
256	Medium 1	High 1	High	High	High	High
257	Medium 1	High 1	High	High	High	High
259	Medium 1	High 1	High	Medium	Low	Low
269	Medium 1	High 1	High	Medium	Low	Medium
270	Medium 1	High 1	High	Medium	Low	High
354	High 2	High 1	Medium	Medium	Low	High
363	High 2	High 1	Medium	Medium	Low	High

Table 2-6. Population, Employment and Trips

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail Employment		Other Employment		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
252	0.046	409	465	26	9	77	125	411	324	161	199
253	0.118	902	1,508	52	106	364	604	868	1,046	585	979
254	0.009	251	73	117	162	60	111	259	45	239	344
255	0.041	155	251	301	288	493	337	163	186	928	770
256	0.032	259	72	383	418	138	269	272	52	644	847
257	0.077	449	508	611	452	756	931	472	374	1,678	1,680
259	0.193	560	777	0	36	816	436	584	569	1,169	603
269	0.057	686	1,455	10	0	0	0	314	1,163	398	469
270	0.045	844	1,652	0	0	6	151	419	1,413	44	287
354	0.003	0	0	14	33	0	33	0	0	19	72
363	0.005	0	0	42	81	2	62	0	0	53	151

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	2	9	0	0	0	11
	2030 Base	11	0	0	0	0	0	11
Population	2000 Base	0	0	4,516	0	0	0	4,516
	2030 Base	6,760	0	0	0	0	0	6,760
Total Employment	2000 Base	0	58	4,209	0	0	0	4,267
	2030 Base	4,647	0	0	0	0	0	4,647

3.0 Travel Behavior Inventory

The following information was provided from neighborhood plans and the model.

3.1 Person and Vehicle Trips

The person and vehicle trips for the study area employees and residents are illustrated in Table 3-1. These were developed from information contained in the PSRC/Trans-Lake model. The area is expected to see increases in person trips (29 percent), but smaller increases in vehicle trips (23 percent). The high transit service assumed in the 2030 baseline model helps to explain these differences.

Table 3-1. Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	5,918	6,402	4,472	5,254
Employed Residents	3,762	5,172	3,222	3,230

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work in Totem Lake by employees is illustrated in Table 3-2. Vanpool users travel the greatest distance as would be expected.

Table 3-2. Average Vehicle Miles Traveled by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	12
Carpool	15
Vanpool	21
Transit	10
Non-Motorized	0

3.3 SR 520 Corridor Trips

Over 6.6 percent of the PM peak period vehicle trips to and from Downtown Kirkland cross the SR 520 bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering the Downtown Kirkland use the bridge, although trips leaving the study area contribute a higher total number of vehicles (i.e. over 1,100) to the bridge traffic. At 2,175, Downtown Kirkland trips comprise 5.3 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	20,571	12,271	32,841
Study Area Trips Crossing SR 520 Bridge	1,171	1,004	2,175
Percent of Case Study Trips Crossing SR 520 Bridge	5.7%	8.2%	6.6%

3.4 Average Vehicle Occupancy for Commute Trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

Carpooling is the most common mode used by employees, but over the past 8 years has decreased as more employees are using transit, as illustrated in Table 3-5.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	**Carpool**	**Vanpool**	**Transit**	**Non-Motorized**	**Other**
1993	1	74%	20%	0%	2%	4%	0%
1995	1	86%	9%	0%	0%	4%	0%
1997	1	83%	11%	0%	1%	4%	0%
1999	2	80%	15%	0%	2%	3%	0%
2001	2	78%	15%	1%	3%	3%	0%

4.0 History with TDM and Land Use Strategies

Generally, the City of Kirkland has promoted higher-density, infill and mixed-use development Downtown through zoning and policy decisions. The City requires design review for projects in the Downtown, which helps to produce development that is pedestrian-friendly and that fits in with the context of the neighborhood. Parking ratios are also lower downtown than they are in the rest of the city and there is some flexibility in allowing developers to lower the amount of required parking in exchange for TDM actions.

Kirkland's emphasis on non-motorized transportation is reflected in their land use codes. Covered bicycle parking is required throughout the city in all new development with the exception of single-family residential. Downtown, numerous pedestrian improvements, such as high-visibility flashing

crosswalks, public art, awnings, and a complete sidewalk network further enhance the walking environment.

Kirkland has several Transportation Management Programs operating as shown in Table 4-1. Addendum A presents additional information about the subsidies offered in these programs.

Table 4-1. List of all TMPs in the City of Kirkland (including Totem Lake and Downtown)

TMP Site Name
Carillon Point
Central Way Plaza
Continental Plaza Building
Crown Pointe Corporate Center
Emerald Building
Evergreen Hospital Medical Center
Forbes Lake Corporate Center
Gateway Plaza
Kirkland 118 Commerce Center
Kirkland 405 Corporate Center
Kirkland Avenue Office Park
Kirkland Way Building
Kirkland Technology Center
Lake Washington Technical College
Lakeshore Clinic
Lakeview Office Building
Linbrook Office Center
Northwest College
Park Place
The Plaza at Yarrow Bay
Touchstone Office Building
Virginia Mason Clinic East
Westwater Project
Yarrow Shores Office Building

Note: Shading are sites not yet completed.

The following tables used data from the Washington State CTR database. Table 4-1 lists the percent of Downtown Kirkland employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	100%	100%	50%	50%
	No	0%	0%	50%	50%
Telecommuting	Yes	100%	0%	100%	100%
	No	0%	100%	0%	0%
Flex Time	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Guaranteed Ride Home	Yes	100%	100%	50%	100%
	No	0%	0%	50%	0%
Ridematching Services	Yes	100%	100%	50%	50%
	No	0%	0%	50%	50%
Shuttle Service	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Bike Subsidy	Yes	100%	0%	50%	50%
	No	0%	100%	50%	50%
Walking Subsidy	Yes	100%	100%	50%	50%
	No	0%	0%	50%	50%
Carpool Subsidy	Yes	100%	100%	50%	50%
	No	0%	0%	50%	50%
Vanpool Subsidy	Yes	0%	0%	50%	50%
	No	100%	100%	50%	50%
Transit Subsidy	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Ferry Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Gen. Transportation Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Uncovered Bicycle Parking	Yes	0%	100%	50%	0%
	No	100%	0%	50%	100%
Covered Bicycle Parking	Yes	0%	0%	50%	100%
	No	100%	100%	50%	0%
Passenger Loading Area	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Shower Facilities	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%

Addendum A. Additional TMP information

The following table is a summary of TMP's, of which many are subject also to the CTR laws of the state of Washington.

State Code	Company	Total # of Employees	# of Affected Employees	Transit
T80004	Carillon Point	1500		$100
T80068	Central Way Plaza	180		$21
T80005	Continental Plaza Building	200		$21
T80006	Crown Pointe Corporate Center	253		$21
T80007	Emerald Building	136		$21
T80070	F & A Plaza	40		$21
T80071	Forbes Lake Corporate Center	225		$21
T80076	Gateway Plaza	105		$21
T80072	Kirkland 118 Commerce Center	140		$21
T80001	Kirkland 405 Corporate Center	1500		$21
T80073	Kirkland Avenue Office Park	130		$21
T80074	Kirkland Way Building	45		$21
T80014	Lakeshore Clinic	30		$54
T80086	Lakeview Office Building	100		$21
T80011	Northwest College	30 employee	800 students	$21
T80078	Park Place	Not Complete		No Program
T80003	The Plaza at Yarrow Bay	310		$30
T80075	Touchstone Office Building	500		$21
T80012	Virginia Mason Clinic East	100		45% 1-zone pa
T80079	Westwater Project	Not Complete		No Program
T80013	Yarrow Shores Office Building	Not Complete		No Program

Source: Kirkland Public Works, Feb 2002 workshop

Addendum B. Additional CTR information

Several firms are subject to the Commute Trip Reduction Program of the state. The following table shows the subsidies given by the firms for those employees using alternative modes for the year 2001.

State Code	Company	Total # of Employees	# of Affected Employees	Transit	Ferry	Vanpool	Carpool	Walking	Bicycling	Other
E86397	Airshow Kirkland	164	161	*10801 120th Avenue NE, Kirkland, WA 9803*			$40	$40	$40	
E85324	AT&T Wireless Svcs. Lake Washington Boulevard	300	300	FlexPass (100%)		FlexPass (100%)	$10 CB+ voucher	$10 CB+ voucher	$10 CB+ voucher	
E87064	BEST Consulting	91	91	$40	$40					
E88096	Captaris	140	138	$87			$25	$25	$25	
E88518	Captura Software	135	131	$35	$130		$25		$25	
E80739	City of Kirkland	239	204	FlexPass or $30 for 60% usage		$30	$30	$30	$30	
E87239	Computer Associates	94	90	$45 CB voucher		$30 CB+ voucher	$30 CB+ voucher	$30 CB+ voucher	$30 CB+ voucher	
E85583	Digeo Broadband Inc. Kirkland	225	225	$21		$21	$21	$21	$21	
E83162	Evergreen Pharmaceutical Inc	236	116	$21		$21	$21	$21	$21	
E86660	FileNET Corporation Kirkland	180	180	$45						
E80069	Kenworth Truck Company Division Headquarters	340	340	100%	60%	$52.80	$15			
E80101	King County Hospital District No. 2 Evergreen Hosp Med. Ctr.	1690	600	$54		$54				
E86595	Lake Washington Technical College	495	144	$27						
E85506	Metrocall Inc.	141	65	FlexPass 100%		$21	$21	$21	$21	$21 motorcycle
E83261	netmanage.com Kirkland	80	79	0	0	0	0	0	0	
E80085	Parametrix Inc Kirkland Office	137	47	50%	$12					
E88104	Rosetta Inpharmatics	200	200	$21		$21	$21	$21	$21	
E85555	Spectra Lux Corporation	93	93	$20		$25	$5	$5	$5	
E88922	Terabeam Kirkland	170	170	New Site - No Program						
E85647	Travis Industries Inc	330	260	0	0	0	0	0	0	
E80325	Vopak USA Inc.	338	275	FlexPass 100%	$26	FlexPass 100%				
	Total	**5,818**	**3,909**							

Source: Kirkland Public Works, February 2002 Workshop

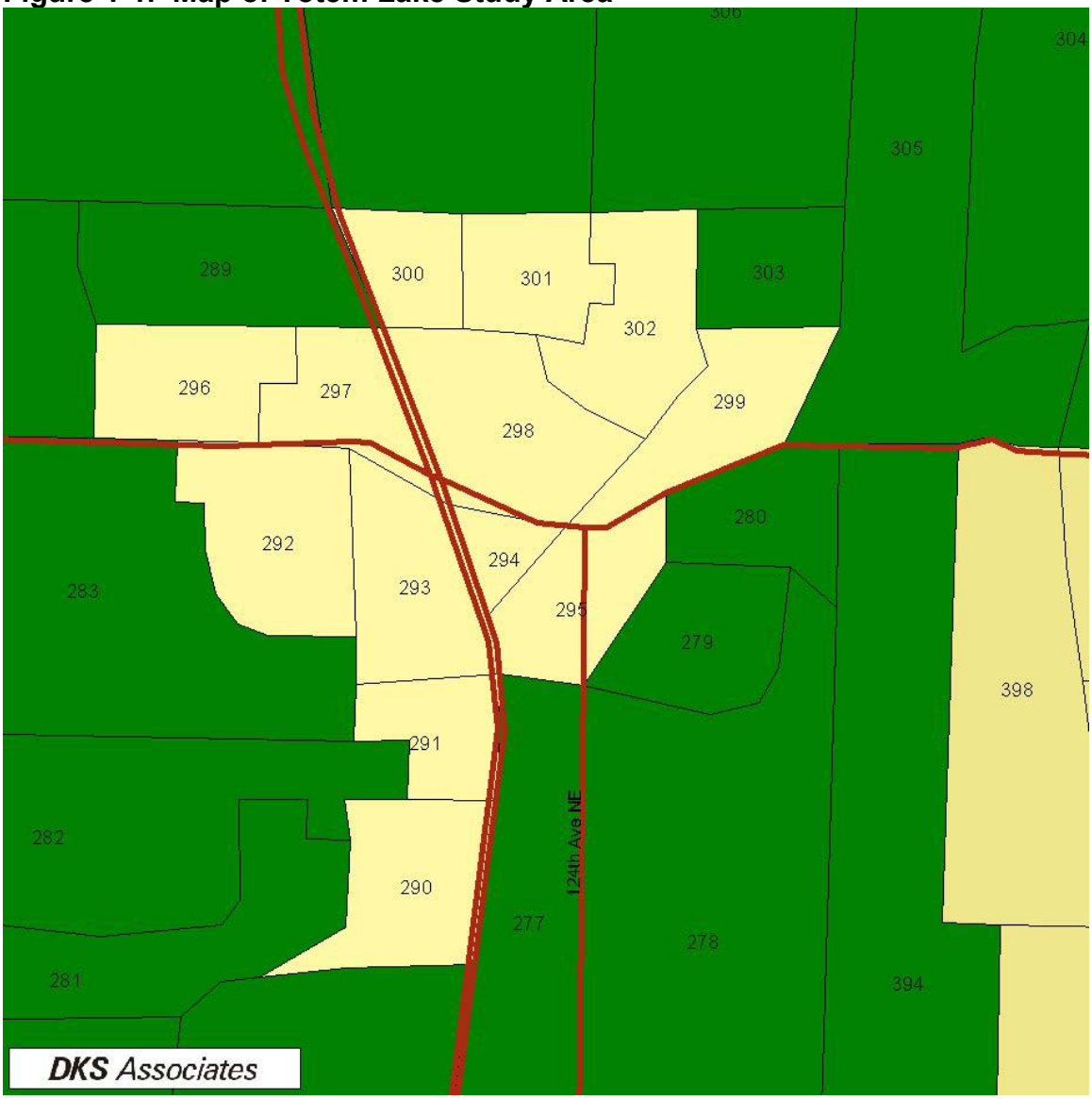
Totem Lake Neighborhood - Kirkland

1.0 Setting and Physical Characteristics

1.1 Location

This section summarizes the Totem Lake area in Kirkland, and the case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Map of Totem Lake Study Area



1.2 Land Use Character and Mix

Totem Lake has been recently designated an "urban center," and is targeted to be a community and regional center for major destination retailing. The area is also a center for health care services, automobile sales, and for high technology and small office parks.

The Totem Lake analysis area includes a wide range of land uses and types of activity centers. The Totem Lake area includes low to moderate density residential (including multi-family housing), office, retail, light industrial and institutional land uses. Two major landmarks in the area east of I-405 include a major regional retail center and the Evergreen Medical Center, which is a major employer. The Evergreen Medical Center is located in the northeast quadrant of the study area, and many smaller medical, dental, and related facilities are located near the hospital. Totem Lake Mall is also located to the east side of the freeway, at Totem Lake Boulevard. Some open space remains around a small body of water named Totem Lake, located just east of Totem Lake Blvd and 124th Ave NE.

On the west side of the freeway, retail is dominant, including grocery stores and a large Fred Meyer store, as well as smaller retail stores and restaurants. Many auto-related businesses such as dealerships and repair shops are located along NE 116th Street. Many offices and light industrial plants are located in business parks in the southwest quadrant.

1.3 Access to Freeways and State Facilities

I-405. The I-405 corridor runs north-south through Kirkland, within 1 mile to the east of the downtown area, and continues north to west of the Totem Lake Center. An EIS was just completed for the I-405 corridor which, given additional funding, could add significant additional capacity to the freeway in the coming years.

SR 522. Totem Lake is about one mile south of the SR-522/405 interchange. SR-522 carries traffic east to Woodinville and Monroe, west through Kenmore, Lake Forest Park, and to Seattle. SR 520 intersects I-405 about 5 miles south of the Totem Lake area.

1.4 Roadway Network

The roadway network was looked at in two ways; first at roadway classifications and secondly at traffic volumes and patterns.

Principal arterials connect Totem Lake area with other regional locations. The principal arterials are NE 124th Street, which runs east-west and provides access to I-405, Juanita, and Redmond, and 124th Ave NE, which runs north-south and provides access to Woodinville and Bothell.

Minor arterials provide connections between principal arterials and serve as key circulation routes within Kirkland. The minor arterials are NE 116th Street, Totem Lake Boulevard, 132nd Avenue NE, NE 132nd Street, and NE 120th Street.

Collectors distribute traffic from arterials to local streets. Local streets give access to individual properties and connect to collectors. The collectors are Slater Ave NE, NE 132nd St, 120th Avenue NE, NE 128th St, NE 130 St, and 116th Way.

1.5 Transit Service

1.5.1 Existing Transit Service

The existing and future transit service levels are discussed in the following sections. Many of these routes just stop at the Kingsgate Park-and-Ride where transfers are available to locations in the study area.

Route 230 services Kingsgate P&R, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, and the downtown Redmond P&R. This route operates seven days a week and generally has an AM peak hour headway of 30 minutes, with 15 minute peak headways between Downtown Kirkland and Bellevue.

Route 236 services Kirkland Transit Center, Kirkland, Juanita, Totem Lake, Kingsgate, Brickyard P&R, Bothell, and the Woodinville P&R. This route operates weekdays and on Saturday with an AM peak hour 30-minute headway on weekdays.

Route 237 services Bellevue, Houghton Freeway Station, Kingsgate Freeway Station, Brickyard P&R, and the Woodinville P&R. This route operates weekdays in the peak period, with a 50 minute headway in the AM peak hour.

Route 238 services Kirkland Transit Center, Kirkland, Rose Hill, Lake Washington Technical College, Totem Lake, Kingsgate P&R, Finn Hill, Brickyard P&R, Bothell P&R, UW Bothell Campus, and Cascadia Community College. This route operates seven days a week, with 25 minute headways in the AM peak hour.

Route 255 services Brickyard P&R, Kingsgate P&R, Kingsgate, Juanita, Kirkland Transit Center, Northwest College, South Kirkland P&R, Montlake, and the Downtown Seattle (tunnel). This route operates seven days a week with 10 minute headways weekday AM peak hour (downtown Kirkland) and 30 minute headways at Totem Lake.

Route 252 services Downtown Seattle, SR-520 Freeway Stops, Kingsgate P&R, Totem Lake, and the neighborhood of Kingsgate. This route operates during the peak period, with the AM peak hour headway of 12 to 30 minutes.

Route 257 services Downtown Seattle, SR-520 Freeway Stops, Houghton Freeway Stop, Kingsgate P&R, Brickyard P&R, and Kingsgate. The route operates on weekdays with 30 minute AM peak hour headway.

Route 277 services Juanita, Kingsgate P&R, Rose Hill, Houghton P&R, SR-520 Freeway stops, and the UW Campus. This route operates Weekdays in the peak period with 30 minute headways.

Route 291 services the Kingsgate P&R, N.E. 132nd St., Willows Rd. employment centers, Redmond Civic Center, Redmond P&R, and Redmond Town Center. This route operates weekdays in the peak periods with a 30 minute headway in the AM peak hour.

Route 342 services Shoreline P&R, Aurora Village Transit Center, Lake Forest Park, Kenmore, Bothell P&R, I-405 & NE 160th St. Freeway Station, Kingsgate Freeway Station, Houghton Freeway Station, Bellevue Transit Center, South Bellevue P&R, Coal Creek Pkwy Freeway Station, Newport Hills, Kennydale, Renton Boeing, and the Renton Transit Center. This route operates weekdays only in the peak period with a 30 minute headway.

Route CT 424 services the Snohomish P&R, Monore P&R, Kingsgate P&R, the UW Montlake freeway transit station and Downtown Seattle. The route operates three weekday AM and three PM peak period buses.

Route ST 530 services the Everett Mall, Eastmont P&R, Ash Way P&R, Canyon Park P&R, I-405 & NE 195th St., UW Bothell Campus, Cascadia Community College, Bothell P&R, Brickyard

freeway station, Kingsgate freeway station, Houghton freeway station, and the Bellevue Transit Center. This route operates weekdays with 30 minute headways in the AM peak hour.

Route ST 535 services the Lynnwood P&R, Alderwood Mall, Canyon Park P&R, I-405 & NE 195th St., UW Bothell Campus, Cascadia Community College, Bothell P&R, I-405 Freeway Stops, and the Bellevue Transit Center. This route operates weekdays with 30 minute headways in the AM peak hour.

Route 935 services Northshore P&R (Kenmore), Bastyr University, Finn Hill, Juanita, Kingsgate, Evergreen Hospital, and Totem Lake. This route operates weekdays with 30 minute headways in the AM peak hour and hour service during the rest of the day. The DART bus will make slight route deviations with advance reservations.

Route 952 is an early morning custom Boeing Company bus to/from the Everett and Kent and Auburn Plants.

Within Kirkland, major areas of employment are generally well served by transit. Peak-hour and all-day service is available to the employment centers and residents at Totem Lake. There is service to/from downtown Kirkland, NE 85th Street and the SR-520 corridor in south Kirkland; most employment centers having a direct transit connection within a quarter mile.

The Kingsgate park-and-ride, located next to I-405 at NE 132nd St serves the Totem Lake area. Eleven Metro buses and three Sound Transit Express buses use the facility, and five hundred parking spaces are available at the lot. The average utilization rate of the park-and-ride was 87 percent in 1997 and 1998. Kingsgate is the second largest and most utilized permanent park-and-ride facility in Kirkland. A transit-only driveway enters and exits on 116th Avenue NE serving a portion of the lot. The remainder of service for the park-and-ride lot is accessible via the two Kingsgate freeway stations located on the east and west sides of Interstate 405.

In addition, there are two other park-and-ride lots in the study area. The Northeast 116th park-and-ride serves four bus routes, with 24 available spaces; with an average rate of use of 42% for both 1997 and 1998. The Lake Washington Christian Church is a leased lot that provides 27 spaces; with use rate of only seven percent.

The Kingsgate park-and-ride is served by Metro 230, 237, 238, 252, 255, 277, 291, 342, 935, 952, Community Transit 424 (from Snohomish/Monroe to Seattle), and Sound Transit 530, 532, and 535 (regional all-day north-south service on I-405 to/from Bellevue and Lynnwood/ Everett). Peak-period service is provided to the UW campus, downtown Seattle, Willows Road and Bear Creek Parkway in Redmond. One Community Transit route stops at the Kingsgate park-and-ride in the peak-period. (Snohomish to downtown Seattle). One custom bus (952) provides service from Auburn, Kent, and the Renton Boeing Plant to the Everett Boeing Plant in the early morning (4-6 am) and afternoon.

The remaining Metro routes provide local connections to/from Woodinville, Bothell, Kenmore, Juanita, Redmond, and downtown Kirkland. Metro 236 also serves the Totem Lake study area with connections to Woodinville.

Approximately 1182 daily person trips occurred at the Kingsgate park-and-ride with nearly 75 percent of these trips occurring during the peak hours, which reflects the dominance of peak-only service provided at this location.

Sound Transit has plans for a new transit center to be located on the east side of I-405 on the Evergreen Hospital campus and near the Totem Lake Mall. In addition, a new HOV interchange will be constructed in Totem Lake at I-405 and NE 128th Street, just south of the Kingsgate park-and-ride lot. This will include a new overpass for general purpose traffic and a high quality east-west connection across I-405 for pedestrians and bicycles. The new transit center will operate with the direct access ramps. Both projects are scheduled to be completed by 2005.

Some High Occupancy Vehicle (HOV) priority treatments are provided in the Kirkland area, mostly on on-ramps to I-405 and on I-405 itself. These treatments increase transit reliability and reduce travel time for the transit routes, which operate on the corridors with treatments. HOV lanes are provided on the inside lanes on I-405 through the City of Kirkland in both the northbound and the southbound directions.

Ramp metering and queue bypass lanes at interchanges in Kirkland also facilitate transit service reliability and increased travel times. The queue bypasses located at the Totem Lake study area are at:

- NE 116th Street/ I-405 Interchange: southbound on-ramp
- NE 124th Street/ I-405 Interchange: southbound on-ramp

1.5.2 Forecast for 2030 Transit Service

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. These conditions are shown in Table 1-1 and Table 1-2.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				23	**23**
	2030			8	6	**14**
Mid-Day	2000				15	**15**
	2030			7	2	**9**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				33	**33**
	2030			40	11	**51**
Mid-Day	2000				22	**22**
	2030			28	5	**33**

1.6 Parking Supply, Availability and Price

Only a limited supply of on-street parking is available in the study area. However, a good amount of well utilized on-street parking was observed near the hospital. All parking in the Totem Lake area is free. Some lots and spaces are designated for employee, visitor and/or customer parking only.

As found in a parking inventory which was performed as part of TEEM's development, the total off-street, non-residential parking capacity in the Totem Lake study area is 11,869 spaces. The total weekday, mid-day demand was found to be 5,784 vehicles, or 49 percent. Table 1-3 provides the number of spaces for each employment classification.

Some offices appeared to be unoccupied, which affected the use rate. About 1,724 of the retail spaces are located at the Totem Lake Mall and 1,997 spaces of the "other", including institutional, are located at the Evergreen Medical Center.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	6,028	3,768	2,073	**11,869**
2000 Demand	2,139	2,021	1,624	**5,784**
2000 D/S Ratio	0.35	0.54	0.78	**0.49**
2030 Supply				**20,790**
2030 Demand				**10,756**
2030 D/S Ratio				**0.52**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs from the PSRC/Trans-Lake Model

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$1.34
Carpool	$0.00	$0.67
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

As discussed in the Totem Lake Neighborhood Plan[1], the non-motorized transportation system is not well established in Totem Lake, with some areas missing pedestrian facilities entirely. In addition, there are inadequate east-west crossings across I-405.

There are bike lanes just outside the Totem Lake study area boundaries. Adjacent to the Totem Lake area, one Class II lane begins at the edge of the area but does not extend through Totem Lake's commercial area on NE 124th St. The other one travels along the north edge of the study area.

NE 116th Street has a marked bike lane from Juanita Beach Park to the Burlington Northern Railroad tracks. NE 132nd Street has a bike lane from 100th Avenue NE to 132nd Ave NE. On 124th Ave NE, bike lanes are marked from near NE 124th St south to NE 85th Street.

The City of Kirkland adopted a Non-Motorized Transportation Plan in 2001. It established a long-term future vision of Kirkland regarding pedestrian and bicycle circulation and identified general actions that the city should undertake to provide for a more comprehensive non-motorized system.

[1] *Totem Lake Neighborhood Plan*, City of Kirkland, January 2002

Plans include a pedestrian/bicycle overpass at NE 128th over I-405 as part of the Sound Transit direct access facility and additional bike facilities in the Totem Lake commercial area.

2.0 Population and Employment Characteristics

Population and employment data for the Totem Lake area are discussed below.

2.1 Population

The population of the Totem Lake area is expected to increase by 1600 people over the next thirty years. (See Table 2-1).

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	1.17	
Population	4,394	6,064

2.2 Employment

Over the next thirty years employment is expected to increase by 10,000 employees, nearly doubling the current base. More than 7,000 of the new jobs will be in the office sector, and retail employment will gain about 2,000 jobs, as shown in Table 2-2 and Table 2-3.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	2,436	4,607
Office	4,288	11,470
Other	3,231	3,243
Total	**9,955**	**19,321**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand
	0-49	50-99	100-499	500+	Total
2000	4,035	1,902	4,018	0	9,955
2030	7,831	3,691	7,798	0	19,321

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the Totem Lake Area. In every zone, the transit level of service and the density either stays the same or improves. Table 2-6 gives the population, employment and trips by local area TAZ for the Totem Lake area. The summary of these characteristics was described in earlier sections. In general, the area expects to see limited population growth and a doubling of employment. Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
290	Medium 2	Medium 1	Low	Low	Low	Low
291	Medium 2	High 1	Medium	Medium	Medium	High
292	Medium 2	High 2	Medium	High	High	High
293	Medium 1	High 1	Medium	Medium	Low	Medium
294	Medium 1	High 1	Medium	Medium	Low	Medium
295	Medium 1	High 1	High	High	Low	Medium
296	Medium 1	Medium 1	Medium	Medium	Low	Low
297	High 2	High 1	Medium	Medium	Low	Medium
298	Medium 1	High 1	High	Medium	Low	Medium
299	Medium 1	High 1	High	High	Low	Medium
300	High 2	High 1	High	Low	Medium	High
301	High 2	High 1	High	Low	Low	High
302	Medium 1	High 1	High	Medium	Low	Low

Table 2-6. Population, Employment and Trips

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail Employment		Other Employment		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
290	0.110	46	20	0	0	954	623	52	15	1,153	783
291	0.064	0	0	69	219	712	1,435	0	0	945	2,360
292	0.127	425	507	22	52	2,933	2,848	329	402	3,316	3,192
293	0.108	0	7	442	1,509	480	540	0	6	1,113	2,594
294	0.026	0	648	231	145	0	0	0	462	352	303
295	0.087	0	82	557	1,121	282	123	0	59	1,185	1,567
296	0.094	1,178	1,453	0	0	0	0	918	1,278	87	118
297	0.079	0	0	314	624	192	278	0	0	614	1,159
298	0.137	71	188	645	720	102	570	45	187	991	1,653
299	0.099	8	259	155	218	797	679	5	201	1,154	1,272
300	0.055	509	647	0	0	734	5,465	320	644	1,082	6,105
301	0.073	509	349	0	0	334	2,151	320	347	2,915	3,106
302	0.106	1,648	1,904	0	0	0	0	1,037	1,893	254	178

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	3	7	3	0	0	13
	2030 Base	10	1	2	0	0	0	13
Population	2000 Base	0	1,018	2,906	471	0	0	4,394
	2030 Base	4,084	507	1,473	0	0	0	6,064
Total Employment	2000 Base	0	1,574	3,692	4,689	0	0	9,955
	2030 Base	15,798	2,899	623	0	0	0	19,321

3.0 Travel Behavior Inventory

The section describes information that was taken from either the Totem Lake Neighborhood Plan or the PSRC/Trans-lake Model.

PM peak hour volumes on the arterials and collectors in the Totem Lake area are as follows: On 124th Ave NE, a major north/south roadway between NE 116th Ave and NE 124th Ave NE, 1209 northbound trips and 917 southbound. On NE 124th Street, an east-west principal, between 124th Ave NE and 132nd Ave NE east of I-405 – there are 1188 eastbound trips and 1738 westbound. West of I-405 on NE 124th St, the section west of 116th Ave NE carries 978 eastbound trips and 1,910 westbound during the PM peak hour.

In comparison to the other subarea the northeast subarea has experienced the most significant increases in traffic over the last six years. Screenline analysis show that, with the exception of one location, ADT has consistently increased at both the north/south and east/west directions of travel between 1992 and 1997

3.1 Person and Vehicle Trips

Existing trip generation is 106,624 daily person trips. Totem Lake generates about one third of the total trips within Kirkland. About 8 percent of Totem Lake trips stay within Totem Lake (vs. 17 percent for the city as a whole). About 57 percent of Totem Lake trips go to areas outside of Kirkland and its planning area. Slightly more trips leave Totem Lake than arrive (57%/43%). The person and vehicle trips for study area employees and residents are illustrated in Table 3-1 (from the PSRC/Trans-Lake model). The area is expected to see more than 10,000 additional daily employee trips; the number of vehicle trips will increase 8,000.

Table 3-1. Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	15,161	24,390	13,347	19,654
Employed Residents	3,025	5,493	2,482	3,854

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work in Totem Lake by employees is illustrated in Table 3-2. Carpool users traveled farther than the other modes; this is different than the VMT patterns in most of the other case studies where vanpools travel the furthest.

Table 3-2. Average Vehicle Miles Traveled by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	21
Vanpool	18
Transit	14
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 1.7 percent of the PM Peak vehicle trips to and from Totem Lake cross the SR 520 bridge. As shown in Table 3-3, both a higher percentage and a higher number of vehicle trips entering Totem Lake use the bridge. Totem Lake trips comprise 3.4 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	69,910	11,823	81,734
Study Area Trips Crossing SR 520 Bridge	583	817	1,399
Percent of Case Study Trips Crossing SR 520 Bridge	0.8%	6.9%	1.7%

3.4 Average Vehicle Occupancy for Commute Trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

Carpooling has been the most commonly used mode by employees, ranging from 14 to 18 percent. The drive-along percentage has decreased slightly over the past 8 years as shown in Table 3-5.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	Carpool	Vanpool	Transit	Non-Motorized	Other
1993	4	82%	14%	0%	1%	3%	1%
1995	5	79%	18%	0%	1%	2%	0%
1997	7	73%	18%	1%	5%	2%	1%
1999	9	79%	15%	0%	4%	2%	0%
2001	4	75%	17%	2%	2%	3%	1%

4.0 History with TDM and Land Use Strategies

The Totem Lake Neighborhood Plan adopted in 2002 calls for changes to zoning in Totem Lake, including design review and regulations to encourage a pedestrian and transit-friendly street environment.

Table 4-1 lists the TMP's located in Kirkland. Table 4-2 shows the percent of Totem Lake employers who stated that they either did or did not offer a specific TDM program as reported in the Washington State CTR Database.

Table 4-1. List of all TMPs in the City of Kirkland (including Totem Lake and Downtown)

TMP Site Name
Carillon Point
Central Way Plaza
Continental Plaza Building
Crown Pointe Corporate Center
Emerald Building
Evergreen Hospital Medical Center
Forbes Lake Corporate Center
Gateway Plaza
Kirkland 118 Commerce Center
Kirkland 405 Corporate Center
Kirkland Avenue Office Park
Kirkland Way Building
Kirkland Technology Center
Lake Washington Technical College
Lakeshore Clinic
Lakeview Office Building
Linbrook Office Center
Northwest College
Park Place
The Plaza at Yarrow Bay
Touchstone Office Building
Virginia Mason Clinic East
Westwater Project
Yarrow Shores Office Building

Note: Shading indicates sites not yet completed.

Table 4-2. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	40%	83%	50%	50%
	No	60%	17%	50%	50%
Telecommuting	Yes	0%	83%	50%	50%
	No	100%	17%	50%	50%
Flex Time	Yes	40%	67%	50%	60%
	No	60%	33%	50%	40%
Guaranteed Ride Home	Yes	80%	100%	50%	60%
	No	20%	0%	50%	40%
Ridematching Services	Yes	40%	83%	50%	70%
	No	60%	17%	50%	30%
Shuttle Service	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Bike Subsidy	Yes	60%	0%	50%	70%
	No	40%	100%	50%	30%
Walking Subsidy	Yes	40%	50%	50%	70%
	No	60%	50%	50%	30%
Carpool Subsidy	Yes	60%	50%	50%	70%
	No	40%	50%	50%	30%
Vanpool Subsidy	Yes	40%	83%	40%	50%
	No	60%	17%	60%	50%
Transit Subsidy	Yes	60%	67%	70%	70%
	No	40%	33%	30%	30%
Ferry Subsidy	Yes	0%	17%	0%	10%
	No	100%	83%	100%	90%
Gen. Transportation Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	60%	100%	80%	90%
	No	40%	0%	20%	10%
Uncovered Bicycle Parking	Yes	60%	83%	50%	0%
	No	40%	17%	50%	100%
Covered Bicycle Parking	Yes	40%	50%	60%	50%
	No	60%	50%	40%	50%
Passenger Loading Area	Yes	20%	50%	30%	0%
	No	80%	50%	70%	100%
Shower Facilities	Yes	60%	100%	70%	80%
	No	40%	0%	30%	20%

Downtown Bellevue

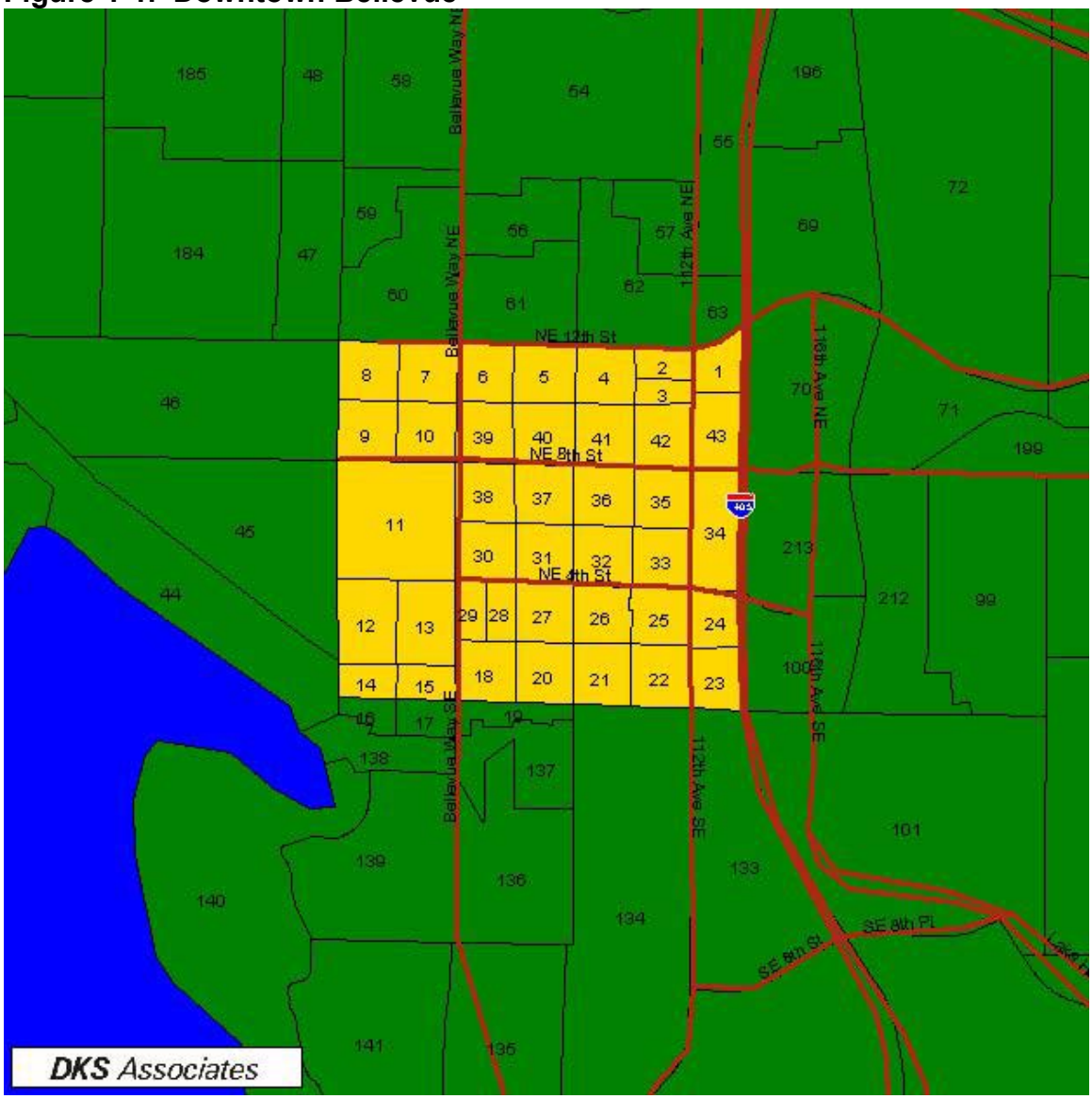
1.0 Setting and Physical Characteristics

1.1 Location

This section summarizes the characteristics of the downtown area of Bellevue, an older, increasingly high-density downtown. Downtown Bellevue extends from I-405 on the east to 100th Avenue NE on the west, and from NE 12th Street on the north just south of Main Street on the south.[1] The case study area boundaries are illustrated in Figure 1-1.

[1] This section was taken from: City of Bellevue CBD Implementation Plan, Final Report, May 1989. DKS Associates et al.

Figure 1-1. Downtown Bellevue



1.2 Land Use Character and Mix

As the financial and business center of the city, Downtown Bellevue is dominated by office and retail uses. Accordingly, it is a major employment center, and this position is expected to be reinforced by continual growth in office development. Downtown Bellevue serves a regional retail and cultural market with a new art museum, a large shopping center and other retail stores. The City of Bellevue has also concentrated more and more residential growth downtown in recent years, in the form of mixed-use development and high rise condominiums. In order to encourage walking activity, the street network downtown has been successfully retrofitted with sidewalks and broken up into smaller blocks. Downtown Bellevue is well served by transit.

1.3 Access to Freeways and State Facilities

As shown in Figure 1-1, three major highways circle downtown.

SR 520. This highway often represents a major bottleneck for travel between Seattle and the eastside of Lake Washington. A lack of adequate mobility across the lake could represent a constraint on the growth of Downtown Bellevue if the growth is dependent on Seattle's employers or shoppers. It is possible, however, that the lack of access to Seattle caused by the constraints on SR 520 may result in an even higher demand for travel to Downtown Bellevue.

I-405. This major freeway in the area runs north-south through Bellevue. It is the eastern border of the study area. I-405, a 16 mile long road connecting I-5 in Tukwila with I-5 in Lynnwood is the state's most congested freeway. Commuters experience up to 12 hours of congestion each day on parts of I-405. The I-405 EIS was completed in 2002 and recommends two additional lanes in each direction, along with an aggressive TDM program and significant increases in transit service.

The existing I-405 interchanges through Downtown Bellevue currently operate at capacity conditions. To support additional growth in the downtown area, improved interchange capacity at I-405 is needed. *Access Downtown* is a construction project that will complete a series of local street improvements in and around downtown Bellevue and specific freeway enhancements at key interchanges with I-405. Access Downtown will add a new interchange at Northeast Sixth Street for buses and carpools, giving buses direct access to an expanded Bellevue Transit Center. It will improve freeway interchanges at Northeast Fourth, Northeast Eighth, and Southeast Eighth streets.

I-90. This corridor is likely to have improved transit and HOV capacity and will likely serve as a key corridor for bus and HOV traffic destined to Seattle. Two-way, all-day HOV lane operation is already being studied in the corridor. No improvements are programmed for the Bellevue Way/I-90 interchange. Widening Bellevue Way to three lanes provides an opportunity to provide an exclusive HOV/bus lane to/from I-90 with connections to the improved bus and HOV facilities in the corridor; however, this function will be served somewhat by direct freeway-to-freeway HOV lane connections at the I-90/I-405 interchange when it is rebuilt.

1.4 Roadway Network

In the downtown area, the major intersections at "gateways" to the Downtown currently experience the greatest congestion. These intersections also tend to serve as a metering function in the transition from freeway to slower, signal-controlled, arterial traffic movement. Intersections in this category include: 112th Avenue NE at NE 8th Street, NE 4th Street, NE 12th Street, and Main Street, and Bellevue Way NE at NE 12th Street.

NE 8th, NE 4th and SE 8th Streets provide access to I-405. In 1999, NE 8th Street had PM peak hour volumes of 2,980 vehicles per hour at 112th Avenue and carried about 56 percent of the combined PM peak traffic with about 5,350 vehicles per hour. At NE 8th Street and NE 4th Street. These latter streets are the two streets most directly serving the Downtown. SE 8th Street, west of I-405, carried about 1,320 trips in the PM peak hour.

NE 8th Street, west of the Downtown, carried about 900 vehicles per hour in 1999 during the PM peak. This arterial serves both local traffic for the residential areas to the west and regional trips that use NE 8th Street and 84th Avenue NE as alternative routes to SR 520 westbound. NE 24th Street primarily carries local traffic in Bellevue, Clyde Hill and Medina.

Major east-west arterials in the portion of Bellevue west of I-405 include NE 8th Street, which extends through Clyde Hill and Medina to the west and runs through Bellevue, eventually connecting to West

Lake Sammamish Parkway to the east. NE 24th Street provides an additional east-west arterial in the residential area north of Downtown.

Bellevue Way and 112th Avenue are the major north-south streets through this area. Bellevue Way links I-90 on the south to SR 520 on the north. 11th Avenue NE is connected to I-90 via Bellevue Way, which it intersects at SE 20th Street. It also connects to SR 520 at the 108th Avenue NE interchange. The section of Bellevue Way immediately north of I-90 had 1999 PM peak volumes of 3,722 vehicles per hour. Where 112th Avenue splits from Bellevue Way, the latter carried about 2,438 PM Peak hour vehicles, about 62 percent of the combined total of 3,910 vehicles per hour for the two arterials.

1.5 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.5.1 Existing Transit Service

In addition to being a destination for regional transit riders, Downtown Bellevue is also a major transfer point. It is estimated that 50 percent of riders that enter downtown are transferring to other services. The following bus routes serve the downtown Bellevue area:

Route 167 is a peak directional route (into Downtown in the AM, out of downtown in the PM) with 30 minute headways. The route serves: University District, SR-520 Freeway Stops, Bellevue Transit Center, Wilburton P&R, Newport Hills P&R, Kennydale, Renton Boeing, South Renton P&R, Kent Transit Center, and Auburn P&R

Route 220 is an all day route with 30 minute headways during the peak hours. The route serves: Redmond P&R, Redmond Town Center, Rose Hill, South Kirkland P&R, and Downtown Bellevue.

Route 222 is an all day route with 30 minute headways during the peak hours. The route serves: Bellevue, Beaux Arts, South Bellevue P&R, Factoria, Eastgate P&R, Bellevue Community College, Overlake, and Overlake P&R.

Route 230 is an all day route with 30 minute headways during the peak hours. The route serves: Kingsgate P&R, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, Redmond P&R

Route 232 is a peak hour route with 20 minute headways. The route serves: Duvall, Cottage Lake, English Hill, Redmond P&R, SR-520, I-405, Bellevue, Bellevue Transit Center

Route 233 is an all day route with 30 minute headways during the peak hours. The route serves: Avondale Rd NE & Avondale Pl NE, Bear Creek P&R, 148th Ave NE, 156th Ave NE, Microsoft, Overlake, Bell-Red Rd, Bellevue Transit Center

Route 234 is an all day route with 30 minute headways during the peak hours. The route serves: Northshore P&R, Kenmore, Finn Hill, Juanita, Kirkland Transit Center, Northwest College, S. Kirkland P&R, 116th Ave NE, Bellevue Transit Center

Route 237 is a directional peak hour route with 15 minute headways. The route serves: Bellevue, Houghton Freeway Station, Kingsgate Freeway Station, Brickyard P&R, and Woodinville P&R.

Route 240 is an all day route with 30 minute headways during the peak hours. The route serves: Clyde Hill, Bellevue Transit Center, South Bellevue P&R, Factoria, Newcastle, Renton Highlands, Renton Boeing, Renton Transit Center, South Renton P&R.

Route 243 is a directional peak hour route with 30 minute headways. The route serves: Jackson Park, Lake City, Ravenna, University Village, Montlake, Evergreen Point, Bellevue, Wilburton P&R

Route 249 is an all day route with 30 minute headways during the peak hours. The route serves: Redmond P&R, West Lake Sammamish Pkwy, Sammamish Viewpoint Park, Overlake, Overlake P&R, NE 20th St, 116th Ave. NE, Bellevue Transit Center.

Route 253 is an all day route with 30 minute headways during the peak hours. The route serves: Bear Creek P&R, Redmond P&R, Redmond Civic Center, 148th Ave NE, Overlake, Overlake P&R, Crossroads, Bellevue Transit Center,

Route 261 is a directional peak hour route (to Seattle in the AM, to Overlake in the PM) with 30 minute headways. This route serves: Overlake P&R, Overlake, Crossroads, N.E. 8th St., Bellevue Transit Center, Clyde Hill, Medina, Montlake, and Downtown Seattle

Route 271 is an all day route with 15-minute headways during the peak hours. The route serves: Issaquah P&R, Eastgate, Eastgate P&R, Bellevue Community College, Bellevue Transit Center, University District.

Route 272 is a directional all day route (to the UW in the AM, to Eastgate in the PM) with 20 minute headways in the peak hours. This route serves: University District, SR-520 Freeway Stops, Crossroads, Lake Hills, Eastgate P&R, Eastgate

Route 342 is a directional peak hour route (to Renton in the AM, to Shoreline P&R in the PM) with 30 minute headways. This route serves: Shoreline P&R, Aurora Village Transit Center, Lake Forest Park, Kenmore, Bothell P&R, I-405 & NE 160th St. Freeway Station, Kingsgate Freeway Station, Houghton Freeway Station, Bellevue Transit Center, South Bellevue P&R, Coal Creek Pkwy Freeway Station, Newport Hills, Kennydale Freeway Station, Renton Boeing, Renton Transit Center

Route 530 is a directional peak hour route (to Bellevue in the AM, to Everett Station in the PM) with 30-minute headways. The route serves: Everett Mall, Eastmont P&R, Ash Way P&R, Canyon Park P&R, I-405 & NE 195th St., UW Bothell Campus, Cascade Community College, Bothell P&R, Brickyard freeway station, Kingsgate freeway station, Houghton freeway station, Bellevue Transit Center

Route 532 is a directional peak hour route (to Bellevue in the AM, to Everett Station in the PM) with 30-minute headways. The route serves: Everett Mall, Eastmont P&R, Ash Way P&R, Canyon Park P&R, Kingsgate freeway station, Bellevue Transit Center

Route 535 is a directional peak hour route (to Bellevue in the AM, to Everett Station in the PM) with 30-minute headways. The route serves: Lynnwood P&R, Alderwood Mall, Canyon Park P&R, I-405 & NE 195th St., UW Bothell Campus, Cascadia Community College, Bothell P&R, Brickyard freeway station, Kingsgate freeway station, Houghton freeway station, Bellevue Transit Center

Route 550 is an all day route with 10-minute headways during the peak hours. The route serves: Bellevue Square, Bellevue Transit Center, South Bellevue P&R, Mercer Island P&R, I-90 & Rainier, Downtown Seattle (tunnel)

Route 555 is a peak hour route with 30-minute headways. The route serves: Issaquah P&R, Eastgate P&R, Bellevue Transit Center, SR-520 Freeway Stations, Northgate Transit Center/

Route 560 is an all day route with 30-minute headways during the peak hours. The route serves: Bellevue Transit Center, South Bellevue P&R, Newport Hills P&R, Kennydale, Renton Boeing, Renton Transit Center, Sea-Tac Airport

Route 565 is an all day route with 30-minute headways during the peak hours. The route serves: Federal Way Transit Center, Auburn Transit Center, Auburn Commuter Rail Station, Kent Transit Center, Renton Transit Center, Boeing Renton, Bellevue Transit Center

Route 921 is an all day route with one hour headways during the peak hours. The route serves: Factoria Square, Somerset, Eastgate P&R, Woodridge, Bellevue

The existing Transit Center facilities were inadequate to meet the needs of Sound Transit's expanded bus service, creating congestion at the Transit Center. In 2002, ten bus bays, shelter improvements and rider amenities were added to the expanded Bellevue Transit Center Island, and shelters have been added to bus stops on 108th Avenue NE and 106th Avenue NE. The improvements will enable more than 100 buses per hour to move efficiently through the center. Roadway improvements on 106th Avenue NE, 108th Avenue NE, 110th Avenue NE, and on Northeast Sixth Street east of 110th Avenue have already been completed to improve transit and traffic flow through the downtown area and around the transit center. Direct access improvements will be completed to connect the transit center to Interstate 405 in 2005.

1.5.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

Over the next thirty years, Downtown Bellevue is expected to get more high frequency bus service. The number of high frequency routes will go from 2 today in the AM Peak to 18 in 2030.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			2	28	**30**
	2030			18	7	**25**
Mid-Day	2000			2	29	**31**
	2030			15	4	**19**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000			10	43	**52**
	2030			96	15	**111**
Mid-Day	2000			10	45	**54**
	2030			62	4	**66**

1.6 Parking Supply, Availability and Price

An extensive inventory of parking in Downtown Bellevue was conducted by the Puget Sound Regional Council in 1999 and was supplemented by the City of Bellevue. The results of the inventory were reported in the 2020 Baseline Transportation Analysis and are repeated here in Table 1-3. The inventory indicated that a total of 28,677 spaces existed in Downtown Bellevue in 1999. Of these, 28,142 (98%) were off-street spaces. Overall, the downtown spaces were 63% occupied. The occupancy in individual sectors varied from 50% to 80%.

Table 1-3. Inventory of Existing Parking in Downtown Bellevue

Sector	1	2	3	4	5	6	7	8	9	Total
On-Street Parking	93	46	9	11	40	18	143	62	113	535
Off-Street Parking	2360	2471	1527	6040	3599	4700	2671	3850	924	28142
Total Parking	2453	2517	1536	6051	3639	4718	2814	3912	1037	28677
Observed P.M. Demand	1818	1742	831	3012	2468	3777	1670	2315	491	18124
Observed P.M. Occupancy	74%	69%	54%	50%	68%	80%	59%	59%	47%	63%

Source: DKS Associates

The average parking costs for Downtown in 1999 are shown in Table 1-4. The averages are based only on those lots with any type of known costs (7.6 percent of all lots). As Table 1-4 illustrates, the second half of the decade saw a great increase in the parking costs associated with stalls in Downtown Bellevue. The parking supply and demand numbers that were developed for the TEEM model are shown in Table 1-5.

Table 1-4. Average Parking Costs 1989 to 1999 in Downtown Bellevue

	1989 Weighted Average	1994 Weighted Average	1999 Weighted Average	Annual Change ('89 to '99)
0-2 hours	$2.18	$2.36	$3.78	5.70%
Daily	$6.01	$6.55	$11.21	6.40%
Monthly	$54.28	$67.47	$105.51	6.90%

Source: Parking Inventory for Seattle and Bellevue 1999, Puget Sound Regional Council, May 2000

Table 1-5. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	*[1]	*[1]	26,645	**26,645**
2000 Demand	*[1]	*[1]	17,084	**17,084**
2000 D/S Ratio	*[1]	*[1]	0.64	**0.64**
2030 Supply				**65,624**
2030 Demand				**23,149**
2030 D/S Ratio				**0.35**

1. The type of parking by type (Retail or Office) was not recorded

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-6.

Table 1-6. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$3.76	$9.11
Carpool	$1.80	$4.34
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

The existing pedestrian facilities in downtown Bellevue consist of sidewalks, crosswalks, signals, and handicapped ramps. Sidewalks exist within and around much of the study area, including the Bellevue Square shopping center. Several of the major through streets have sidewalks along all or most of their length, including 100th Avenue NE, Bellevue Way, 106th Avenue NE, 108th Avenue NE and NE 4th Street. However, many of these streets are not in compliance with widths required in the Land Use Code. Major streets with segments lacking on one or both sides are Main Street, NE 1st Street, NE 8th Street, NE 6th Street, NE 2nd Street and 110th Avenue NE. Sidewalk widths range from 8 to 12 feet along most streets, but there are several locations where the useable width is narrower due to obstructions. The 12-foot sidewalks include a four-foot planning strip at the curb for street trees. Along Main Street in the downtown area, brick sidewalks have been installed.

Marked crosswalks are located at most intersections within the downtown and at all signalized intersections. Crosswalks at signalized intersections have walk/don't walk signals. Many of these signals require pedestrian activation by push buttons.

Based on City of Bellevue data, quite a few handicapped ramps exist throughout the study area. Some intersections are missing ramps on some of their corners. In these situations, a crosswalk has a ramp on one end but not on the other. [2]

2.0 Population and Employment Characteristics

Population and employment data for Downtown Bellevue are discussed below.

2.1 Population

The population of Downtown Bellevue is forecast to increase over seven times its current population over the next thirty years (See Table 2-1). This huge increase is due to the way that the City leaders are aggressively pursuing many types of densification techniques to enhance the downtown. This increase in population could potentially increase the effectiveness of transit and non-motorized modes significantly in the area.

[2] This section was taken from: City of Bellevue CBD Implementation Plan, Final Report, May 1989. DKS Associates et al.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	0.65	
Population	2,145	15,277

2.2 Employment

Similar to the population forecasts, Downtown Bellevue is expected to see a huge increase in the number of office workers (over 38,000 workers). In addition, the number of retail workers is expected to almost double. The increase is expected to be fairly well distributed by size of employer, as shown in Table 2-2 and Table 2-3.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	7,336	13,919
Office	15,816	53,886
Other	153	64
Total	**23,305**	**67,869**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	8,378	3,589	5,674	5,664	23,305
2030	24,398	10,452	16,523	16,496	67,869

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in Downtown Bellevue. Transit service is already high throughout the area, and is forecast to become even better over the next thirty years. In general, the mix of uses in the area is not forecast to change in any noticeable direction, while the density is expected to increase for many of the zones. Table 2-6 gives the population, employment and trips by local area TAZ for Downtown Bellevue. The summary of these characteristics was described in earlier sections. In general, the zones are expected to see huge increases in population and employment, as well as production and attraction trips. Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
1	High 2	High 1	Low	Low	Low	High
2	Medium 1	High 1	Low	Low	High	High
3	High 2	High 1	Low	Low	Low	High
4	High 2	High 1	Low	Low	Low	Medium
5	Medium 1	High 1	Low	Low	Low	High
6	Medium 1	High 1	Medium	Medium	Medium	High
7	Medium 2	High 1	Medium	Medium	Medium	High
8	Medium 2	High 1	Medium	Medium	Low	Medium
9	Medium 2	High 1	Medium	Medium	Medium	High
10	Medium 1	High 1	Medium	Medium	High	High
11	High 2	High 1	Medium	Medium	High	High
12	Medium 2	High 1	Medium	High	Low	Low
13	High 2	High 1	Medium	Medium	Low	Medium
14	Low 1	Medium 2	Medium	High	Medium	High
15	Low 1	High 1	Medium	Medium	High	High
18	Medium 2	High 1	Medium	Medium	High	High
20	High 2	High 1	Low	Low	High	High
21	High 2	High 1	Low	Low	Medium	High
22	High 2	High 1	Low	Low	High	High
23	High 2	High 1	Low	Low	Low	Low
24	High 2	High 1	Low	Low	High	High
25	High 2	High 1	Low	Low	Medium	High
26	High 2	High 1	Low	Low	High	High
27	High 2	High 1	Low	Low	High	High
28	High 2	High 1	Medium	Low	Medium	High
29	Medium 2	High 1	Medium	Medium	Medium	High
30	High 2	High 1	Medium	Low	High	High
31	High 2	High 1	Medium	Low	High	High
32	High 2	High 1	Low	Low	High	High
33	High 2	High 1	Low	Low	High	High
34	High 2	High 1	Low	Low	Medium	Medium
35	High 2	High 1	Low	Low	Medium	High
36	High 2	High 1	Low	Low	High	High
37	High 2	High 1	Medium	Low	High	High
38	High 2	High 1	Medium	Low	High	High
39	High 2	High 1	Medium	Medium	High	High
40	High 2	High 1	Low	Low	Medium	High
41	High 2	High 1	Low	Low	High	High
42	High 2	High 1	Low	Low	High	High
43	High 2	High 1	Low	Low	Low	Low

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
1	0.012	0	0	0	23	108	1,614	0	0	120	1,870
2	0.008	338	816	8	43	5	6	498	1,001	63	137
3	0.007	9	601	0	17	42	81	9	737	47	170
4	0.015	0	448	0	33	40	46	0	549	101	242
5	0.017	173	1,463	25	46	21	59	306	2,844	152	408
6	0.015	0	451	213	357	17	19	0	876	276	548
7	0.016	0	64	112	504	78	81	0	125	616	1,228
8	0.016	119	231	15	86	38	44	210	448	80	193
9	0.016	71	102	212	463	0	0	126	198	269	617
10	0.016	0	77	330	498	45	53	0	150	450	718
11	0.062	0	0	3,313	4,663	0	0	0	0	8,060	10,803
12	0.022	17	24	3	5	6	7	30	48	12	18
13	0.022	1	303	98	81	22	26	2	588	144	176
14	0.009	159	805	44	117	45	50	283	1,565	160	320
15	0.009	0	322	165	116	31	52	0	626	234	253
18	0.016	0	354	319	695	14	646	0	688	404	1,675
20	0.016	271	781	99	179	691	1,548	482	1,517	935	2,070
21	0.016	0	746	211	508	8	574	0	915	264	1,397
22	0.017	87	1,343	84	123	1,016	1,344	128	1,647	1,243	1,817
23	0.014	0	0	0	23	0	0	0	0	128	269
24	0.013	0	0	0	23	294	680	0	0	328	805
25	0.016	130	900	38	83	112	1,002	191	1,103	189	1,334
26	0.015	269	792	32	93	297	2,679	397	971	407	3,248
27	0.016	0	386	107	220	531	3,847	0	751	720	4,636
28	0.008	0	322	126	81	11	990	0	626	167	1,259
29	0.008	0	470	54	190	73	0	0	914	153	312
30	0.016	43	0	169	370	1,445	2,731	77	0	1,834	3,568
31	0.015	0	0	552	718	1,258	3,078	0	0	2,068	4,372
32	0.016	0	0	0	104	2,816	6,648	0	0	3,130	7,714
33	0.016	0	0	0	0	662	771	0	0	736	1,091
34	0.026	0	0	29	32	397	462	0	0	477	569
35	0.016	0	0	154	631	81	3,322	0	0	437	5,417
36	0.016	0	0	55	27	671	3,574	0	0	825	4,122
37	0.016	0	0	225	151	1,271	6,557	0	0	1,685	7,518
38	0.016	0	263	144	1,150	511	2,308	0	511	743	4,555
39	0.016	0	103	261	401	1,354	2,936	0	200	2,093	4,383
40	0.017	4	750	123	923	161	3,059	6	1,457	329	5,012
41	0.016	53	627	0	46	1,425	1,674	76	769	1,592	2,027
42	0.017	398	1,733	15	97	369	1,382	572	2,126	482	2,117
43	0.017	2	0	0	0	3	0	2	0	151	176

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	28	4	6	2	0	40
	2030 Base	39	0	0	1	0	0	40
Population	2000 Base	0	1,268	511	206	159	0	2,145
	2030 Base	14,472	0	0	805	0	0	15,277
Total Employment	2000 Base	0	21,434	664	924	284	0	23,305
	2030 Base	67,702	0	0	168	0	0	67,869

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. As the population of Downtown Bellevue is expected to increase dramatically in the next 30 years, so are the employed residents. Additionally, the number of employees who work in Downtown Bellevue is expected to more than double in the next 20 years, leading to a huge increase in vehicle trips to the area.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	32,305	89,164	20,267	18,964
Employed Residents	3,395	23,951	2,353	15,833

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work by Downtown Bellevue employees are illustrated in Table 3-2. As one would expect, vanpool users traveled much farther than the other modes, with drive alone and transit users traveling about the same distance.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	18
Vanpool	33
Transit	15
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 2.2 percent of the PM Peak vehicle trips to and from Downtown Bellevue cross the SR 520 bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering the Downtown Bellevue use the bridge, although trips leaving the study area contribute a higher total number of vehicles to the bridge traffic. At 3,994, Downtown Bellevue trips comprise 9.7 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	218,222	45,393	263,616
Study Area Trips Crossing SR 520 Bridge	2,438	1,556	3,994
Percent of Case Study Trips Crossing SR 520 Bridge	1.1%	3.4%	1.5%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There were between eight and eighteen CTR employers that provided updates to the CTR database in the Downtown Bellevue area on any given year. The mode split for these employers is shown in Table 3-5. The drive alone mode split has dropped somewhat over the years, while the percentage of employees who use transit to get to Downtown Bellevue has increased.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	**Carpool**	**Vanpool**	**Transit**	**Non-Motorized**	**Other**
1993	8	61%	22%	2%	12%	1%	1%
1995	16	69%	17%	2%	9%	2%	1%
1997	17	65%	17%	2%	13%	1%	1%
1999	18	59%	21%	3%	16%	1%	1%
2001	16	58%	19%	3%	18%	1%	1%

4.0 History with TDM and Land Use Strategies

The Cit of Bellevue has developed many TDM type programs over the years. In particular, in 2001 they developed a series of programs that are funded by the City, the County and the Downtown Bellevue Association[3]. These five programs listed are:

1. Employer Outreach Coordinator

[3] City of Bellevue, Access Downtown Rideshare Program, May 2001

2. Rideshare Plus Program
3. Area-Wide FlexPass
4. Incentives for Vanpool Formation
5. Media Coverage.

Table 4-1 lists the percentage of Downtown Bellevue employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	43%	47%	27%	23%
	No	57%	53%	73%	77%
Telecommuting	Yes	21%	88%	55%	38%
	No	79%	12%	45%	62%
Flex Time	Yes	64%	65%	82%	50%
	No	36%	35%	18%	50%
Guaranteed Ride Home	Yes	71%	65%	41%	38%
	No	29%	35%	59%	62%
Ridematching Services	Yes	36%	29%	41%	35%
	No	64%	71%	59%	65%
Shuttle Service	Yes	14%	6%	14%	15%
	No	86%	94%	86%	85%
Bike Subsidy	Yes	13%	33%	5%	8%
	No	87%	67%	95%	92%
Walking Subsidy	Yes	13%	6%	5%	4%
	No	87%	94%	95%	96%
Carpool Subsidy	Yes	27%	18%	32%	23%
	No	73%	82%	68%	77%
Vanpool Subsidy	Yes	53%	47%	73%	50%
	No	47%	53%	27%	50%
Transit Subsidy	Yes	67%	41%	82%	69%
	No	33%	59%	18%	31%
Ferry Subsidy	Yes	27%	29%	18%	15%
	No	73%	71%	82%	85%
Gen. Transportation Allowance	Yes	13%	12%	9%	8%
	No	87%	88%	91%	92%
Clothes Locker	Yes	21%	29%	32%	31%
	No	79%	71%	68%	69%
Uncovered Bicycle Parking	Yes	29%	24%	32%	0%
	No	71%	76%	68%	100%
Covered Bicycle Parking	Yes	64%	71%	86%	69%
	No	36%	29%	14%	31%
Passenger Loading Area	Yes	43%	71%	64%	0%
	No	57%	29%	36%	100%
Shower Facilities	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%

Crossroads (Bellevue)

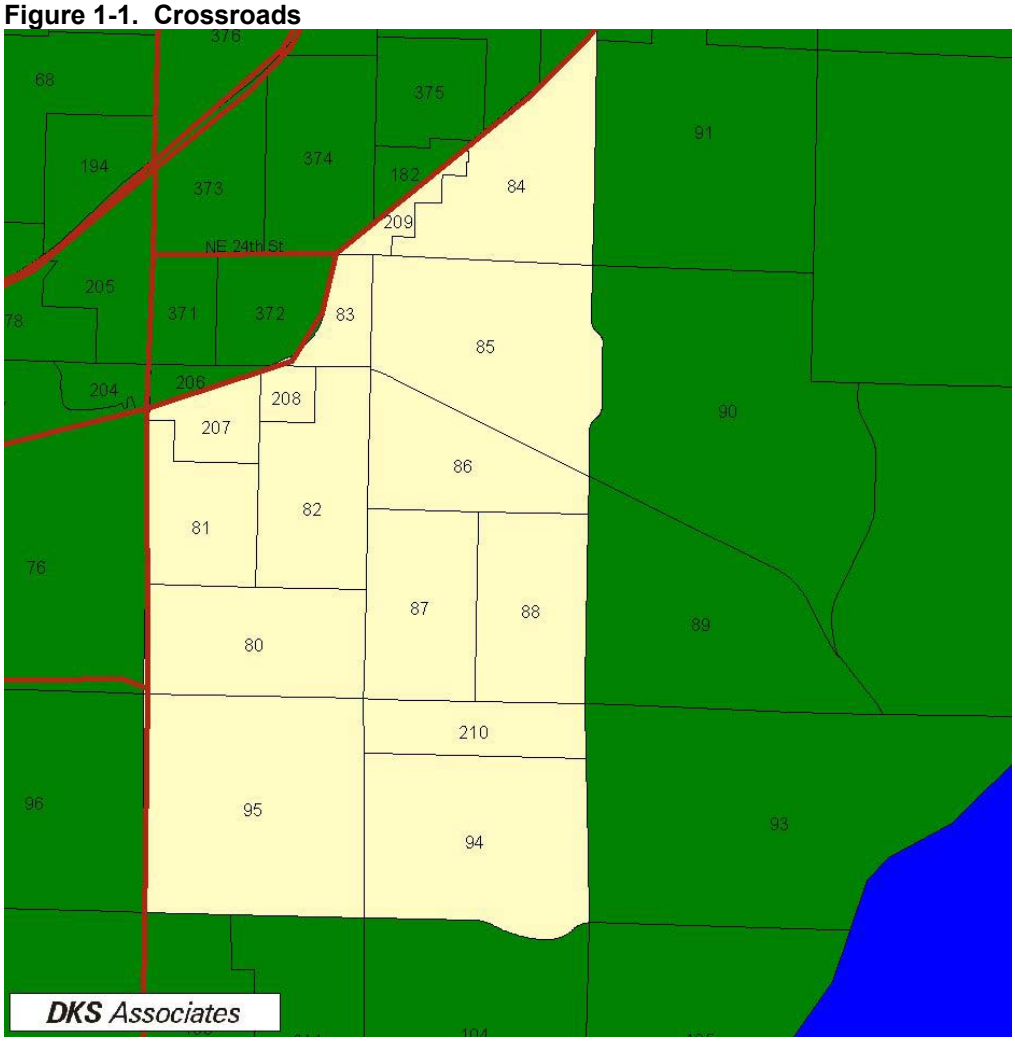
1.0 Setting and Physical Characteristics

1.1 Location

Crossroads is an area of 8,895 acres bounded by Bellevue-Redmond Road on the north, 148th Avenue N.E. on the west, Main Street on the south, and 164th Avenue N.E. on the east. The case study area boundaries are illustrated in Figure 1-1.

Crossroads contains a mix of residential, office, and retail uses. Strong single-family neighborhoods, an abundance of multifamily complexes, Crossroads Shopping Center, and office complexes mix together compatibly. Crossroads residents and merchants refer to their part of town as a "city within a city".

Figure 1-1. Crossroads



1.2 Land Use Character and Mix

There are 4,390 residential units in Crossroads. Of those, 1,183 (27 percent) are single-family detached. The remaining 3,207 (73 percent) consist of a mix of attached units: condominiums, townhouses, and apartments. The housing mix in Crossroads suggests the presence of families, children, young adults and older residents.

Crossroads contains some 277,099 gross square feet of retail use, 440,914 square feet of office space, 503,885 square feet of mixed use, as well as schools and facilities for area children.

The 28-acre city park known as Crossroads Center is a major feature. A youth and community center plus a par 3 golf course provide recreational opportunities for area residents. There are 5.9 additional acres of park land, 14.2 acres of open space, and 61.7 acres of school land in Crossroads.

1.3 Access to Freeways and State Facilities

As shown in Figure 1-1, SR 520 is the nearest freeway, although two other freeways, I-90 and I-405, play a large role in vehicular travel to and from the Crossroads area.

SR 520. Access to this freeway from the crossroads area is via NE 148th Avenue. SR 520 travels to the Redmond Area in the north-east direction, and to the Seattle area in the west direction.

I-90. Access to this freeway from the crossroads area is either via NE 148th Avenue or Northrup Way to West Lake Sammamish Parkway SE. I-90 travels eastern King County and beyond in the east direction, and to the Seattle area in the west direction.

I-405. The most logical access to this freeway from the crossroads area is either via NE 8th Street or SR 520, depending on both traffic conditions, and the final destination of the traveler. I-405 travels from Tukwila at its north end to Lynnwood at its south end, linking up with I-5 at either end. Roadway Network

The major gateways into the Crossroads area are NE 8th Street from the west, NE 148th Street from the north, SE 148th Street and SE 156th Street from the South.

1.4 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.4.1 Existing Transit Service

The follow bus routes serve the Crossroads area:

Route 261 is a weekday, peak hour route with a 30-minute headway. This route services the Overlake Park and Ride, Overlake, Crossroads, N.E. 8th St., Bellevue, Clyde Hill, Medina, Montlake, and Downtown Seattle.

Route 253 services the Bear Creek Park and Ride, the Redmond Park and Ride, Redmond Civic Center, 148th Ave NE, Overlake, Crossroads, and the Bellevue Transit Center. This route has a 30-minute weekday headway and a 60-minute weekend headway.

Route 245 services Kirkland, the Houghton Park and Ride, Redmond, Overlake, Bellevue, the Eastgate Park and Ride, and Factoria. This route operates on both the weekday and the weekend. This route has a 30-minute headway on weekdays and Saturdays and a 60-minute headway on Sundays.

Route 229 is a weekday route that services Overlake, Crossroads, Phantom Lake, the Eastgate Park and Ride, Factoria, and Downtown Seattle (tunnel). This is a peak hour route with a 30-minute headway.

Route 926 operates on the weekdays servicing the Crossroads Mall, 164th Ave NE, Phantom Lake, Bellevue Community College, the Eastgate Park and Ride, and DART service. The peak hour headway for this route is 30-minutes and the midday headway is 60 minutes.

Route 247 is a weekday, peak hour route with a 60-minute headway. This route services Redmond, Overlake, the Overlake Park and Ride, the Overlake Transit Center, the Eastgate Park and Ride, Factoria, the Newport Hills Park and Ride, Kennydale Freeway Station, Renton Boeing, Renton, South Renton Park and Ride, Kent, and Kent Boeing.

Route 222 operates seven days a week servicing Bellevue, Beaux Arts, South Bellevue Park and Ride, Factoria, Eastgate Park and Ride, Bellevue Community College, Overlake, and the Overlake Park and Ride. The weekday headway is 30 minutes, the Saturday headway is 30 to 60-minutes, and the Sunday headway is 60-minutes.

Route 225 operates on weekdays during the peak hours servicing Downtown Seattle (tunnel), Factoria, Eastgate Park and Ride, Phantom Lake, Overlake, and the Overlake Transit Center. This is a peak hour route with a 60-minute headway.

Route 230 services the Kingsgate Park and Ride, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., the South Kirkland Park and Ride, Bellevue Way NE, the Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, and the Redmond Park and Ride. This route operates on both the weekday with a 30-minute headway and the weekends with a 60-minute headway.

Route 272 operates on the weekdays servicing the University District, SR-520 Freeway Stops, Crossroads, Lake Hills, the Eastgate Park and Ride, and Eastgate. This route has a peak hour headway of 30 minutes.

Route 233 services Avondale Rd NE & Avondale Pl NE, the Bear Creek Park and Ride, 148th Ave NE, 156th Ave NE, Microsoft, Overlake, Bell-Red Rd, and the Bellevue Transit Center. This route operates on weekdays with a 30-minute headway as well as Saturdays with a 60 minute headway.

Route 890 operates on the weekdays servicing the University District, SR-520 Freeway Stops, Crossroads, Lake Hills, Eastgate Park and Ride, and Eastgate.

1.4.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

A number of high frequency routes are forecast to be added in the future years. In this way, the model predicts a few less routes, but much better service.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				21	**21**
	2030			9	8	**17**
Mid-Day	2000				20	**20**
	2030			7		**7**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				28	**28**
	2030			40	16	**56**
Mid-Day	2000				31	**31**
	2030			28		**28**

1.5 Parking Supply, Availability and Price

The main parking lot in Crossroads is at the Crossroads Shopping Center. According to counts performed during the development of TEEM, there are approximately 2,240 free parking spaces at this location, although this count was done prior to a recent construction project. In addition, there is a huge parking lot for Top Foods that is not part of this approximate number.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	5,167	2,133	1,659	**8,959**
2000 Demand	1,916	944	644	**3,504**
2000 D/S Ratio	0.37	0.44	0.39	**0.39**
2030 Supply				**10,769**
2030 Demand				**5,136**
2030 D/S Ratio				**0.48**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$0.67
Carpool	$0.00	$0.33
Vanpool	$0.00	$0.00

1.6 Pedestrian and Bicycle Facilities

Crossroads has a unique mix of single-family and multifamily housing in proximity to shopping and activity centers which could potentially generate a good deal of pedestrian and other non-motorized traffic in the area. However, an incomplete sidewalk network in the neighborhood and lack of street connectivity means that much of this potential goes unrealized. With few through streets in the area, there is a lack of motorized and non-motorized connectivity within Crossroads. Most streets are accessways and drives into apartments that prohibit pedestrian and vehicular movement.

Crossroads Park provides a good network of nonmotorized trails, linking various land uses on all sides of the park. Improvements to sidewalks along the mall frontage on 156th Ave NE have also been made in recent years. These features, plus the addition of newly developed facilities for senior citizens and the disabled, suggest that continuing emphasis will likely be placed on pedestrian amenities and convenient access to public transit services in the future.

2.0 Population and Employment Characteristics

Population and employment data for the Crossroads area are discussed below.

2.1 Population

The size and population for both 2000 and 2030 of the case study area is given in Table 2-1. The population is expected to increase by three thousand people over the next thirty years.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	1.56	
Population	10,378	13,637

2.2 Employment

The total employment and the mix of employment are expected to remain relatively constant over the next thirty years Table 2-2 illustrates that there are two thousand more employees forecasted for the area in the next thirty years. These additional employees are fairly well distributed by both employment type and size of employer, as illustrated in Table 2-3.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	1,897	2,346
Office	2,104	3,717
Other	367	373
Total	**4,368**	**6,436**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	1,665	1,058	1,646	0	4,368
2030	2,453	1,558	2,425	0	6,436

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table-2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the Crossroads area. Transit service is relatively good throughout the area, and is forecast to become even better over the next thirty years. In general, the mix of uses in the area is not forecast to change in any noticeable direction, although the density is expected to increase for many of the zones. Table 2-6 gives the population, employment and trips by local area TAZ for the Crossroads area. The summary of these characteristics was described in earlier sections. Table 2-7 shows that in the future most of the population and employment will be in zones that are better serviced by transit.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
80	Medium 2	High 2	Medium	Medium	Low	Low
81	Medium 1	High 1	Medium	Medium	Low	Low
82	High 2	High 1	Medium	High	Medium	Medium
83	High 2	High 1	Medium	Medium	Low	Medium
84	High 2	High 1	Low	Low	Low	Low
85	High 2	High 1	High	Medium	Low	Low
86	Medium 1	High 1	High	High	Low	Low
87	Medium 2	Medium 1	Medium	Medium	Medium	Medium
88	Medium 2	Medium 1	Medium	High	Low	Medium
94	Medium 2	Medium 1	Medium	Medium	Low	Low
95	Medium 2	High 2	Medium	Medium	Low	Low
207	High 2	High 1	High	High	Low	Low
208	High 2	High 1	High	High	Low	Medium
209	High 2	High 1	Low	Low	Medium	High
210	Medium 2	Medium 1	High	High	Low	Medium

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
80	0.124	1,643	1,957	0	0	129	227	1,127	1,257	249	378
81	0.076	501	566	0	0	0	0	263	283	22	26
82	0.110	2,503	3,213	121	157	154	313	1,826	2,172	491	775
83	0.031	0	0	262	288	0	301	0	0	318	717
84	0.134	766	1,062	0	0	48	53	448	535	90	109
85	0.188	338	295	0	0	1,148	1,297	191	196	1,443	1,652
86	0.102	1,475	1,724	18	19	1	2	1,075	1,170	141	166
87	0.109	153	165	1,382	1,715	41	47	112	115	1,732	2,324
88	0.107	1,307	2,036	18	16	112	416	955	1,359	255	635
94	0.196	670	839	0	0	34	34	583	586	140	183
95	0.248	810	1,164	56	79	65	67	785	917	287	338
207	0.037	14	15	6	36	88	188	7	8	185	350
208	0.016	14	19	0	0	62	298	7	9	69	330
209	0.019	0	350	17	18	219	305	0	245	281	427
210	0.063	183	230	18	19	370	541	206	207	457	632

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	7	2	6	0	0	15
	2030 Base	9	2	4	0	0	0	15
Population	2000 Base	0	3,635	1,976	4,767	0	0	10,378
	2030 Base	7,245	3,121	3,271	0	0	0	13,637
Total Employment	2000 Base	0	2,125	20	2,224	0	0	4,368
	2030 Base	3,275	373	2,788	0	0	0	6,436

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. The person trips for study are employees and residents are expected to see similar growth in the next 30 years. However, the vehicle trips for employed residents are expected to grow modestly, while the study area person trips are expected to almost double. The model forecasts these conditions because of the large increase in transit service that is expected in the Crossroads area.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	6,159	9,042	5,218	7,278
Employed Residents	7,584	9,059	6,039	6,160

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work by Crossroads employees are illustrated in Table 3-2. As one would expect, the vanpool users traveled much farther than the other modes, with drive alone and transit users traveling about the same distance.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	23
Vanpool	26
Transit	16
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 2.2 percent of the PM Peak vehicle trips to and from Crossroads cross the SR 520 bridge. As shown in Table 3-3, a higher percentage of vehicle trips entering Crossroads use the bridge, although trips leaving the study area contribute a higher total number of vehicles to the bridge traffic. At 1,610, Crossroads trips comprise around 3.9 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	35,722	18,690	54,412
Study Area Trips Crossing SR 520 Bridge	705	905	1,610
Percent of Case Study Trips Crossing SR 520 Bridge	2.0%	4.8%	3.0%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There are only a few CTR employers in the Crossroads area that provided updates to the CTR database on any given year. The mode-split for these employers is shown in Table 3-5. Over the years, the percent of employees that drive alone has decreased tremendously. These users have gone fairly evenly to carpools, vanpools, and transit.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	**Carpool**	**Vanpool**	**Transit**	**Non-Motorized**	**Other**
1993	1	84%	13%	1%	1%	1%	0%
1995	2	85%	12%	1%	1%	1%	0%
1997	2	77%	15%	5%	1%	1%	1%
1999	3	77%	14%	5%	3%	1%	0%
2001	2	69%	17%	7%	5%	2%	1%

4.0 History with TDM and Land Use Strategies

Table 4-1 lists the percent of Crossroads employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	0%	0%	67%	67%
	No	100%	100%	33%	33%
Telecommuting	Yes	50%	100%	33%	33%
	No	50%	0%	67%	67%
Flex Time	Yes	0%	50%	67%	67%
	No	100%	50%	33%	33%
Guaranteed Ride Home	Yes	50%	50%	67%	67%
	No	50%	50%	33%	33%
Ridematching Services	Yes	50%	50%	67%	67%
	No	50%	50%	33%	33%
Shuttle Service	Yes	0%	50%	0%	0%
	No	100%	50%	100%	100%
Bike Subsidy	Yes	0%		0%	0%
	No	100%		100%	100%
Walking Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Carpool Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Vanpool Subsidy	Yes	0%	50%	67%	67%
	No	100%	50%	33%	33%
Transit Subsidy	Yes	0%	0%	67%	67%
	No	100%	100%	33%	33%
Ferry Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Gen. Transportation Allowance	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Clothes Locker	Yes	50%	50%	67%	67%
	No	50%	50%	33%	33%
Uncovered Bicycle Parking	Yes	0%	0%	33%	0%
	No	100%	100%	67%	100%
Covered Bicycle Parking	Yes	50%	50%	33%	33%
	No	50%	50%	67%	67%
Passenger Loading Area	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Shower Facilities	Yes	50%	50%	100%	100%
	No	50%	50%	0%	0%

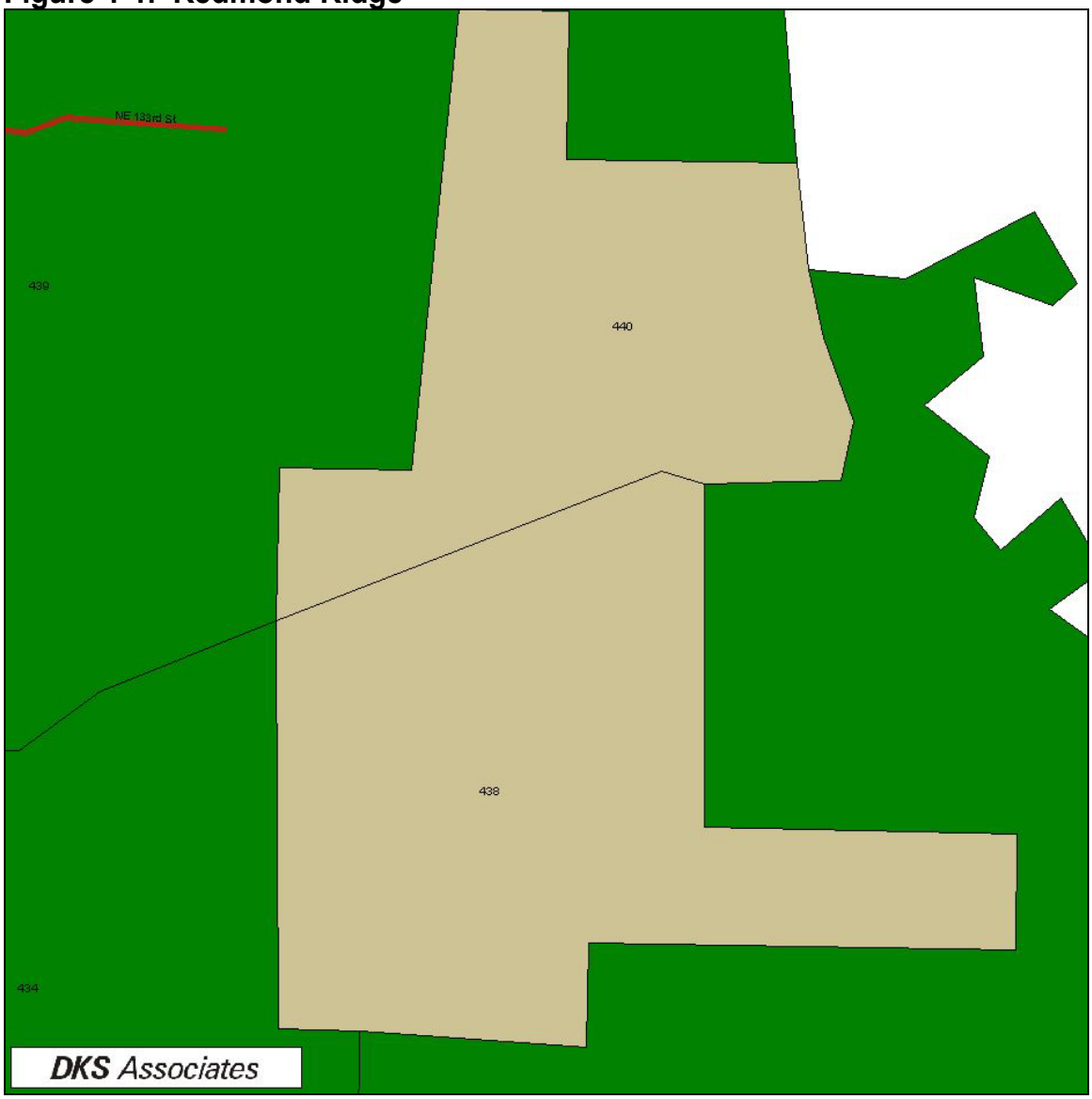
Redmond Ridge

1.0 Setting and Physical Characteristics

1.1 Location

Redmond Ridge is situated in a largely rural part of King County east of Seattle, Bellevue, Kirkland and Redmond. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Redmond Ridge



1.2 Land Use Character and Mix

The development in the area will drastically change the population and employment dynamics of the formerly rural area. There are two proposed developments. Redmond Ridge, which will contain housing, employment and commercial uses, is located south of Novelty Hill Road, while Trilogy, the parcel north of Novelty Hill Road, is built on a golf course and is age restricted (55 years old and up only).

The current concurrency application for Redmond Ridge and Blakely Ridge calls for 8,200 residents (based on 3050 households), 450 new retail jobs, and 3750 office jobs. For new applications in the panhandle area, the City estimates that the population at build-out will be 1,660 (based on 800 households), with no new employment and 12 soccer fields.

1.3 Access to Freeways and State Facilities

The closest state highways to Redmond Ridge/Trilogy are SR 520 and SR 202, neither of which run through the case study area. To travel on either SR 202 or SR 520, users would first have to travel west on NE Novelty Hill Road.

1.4 Roadway Network

The main road in the case study area is NE Novelty Hill Road, which serves all destinations outside the study area. All other roads within the two developments lead to Novelty Hill Road.

1.5 Transit Services

The existing and future transit service levels are discussed in the following sections.

1.5.1 Existing Transit Service

Currently, there is only limited transit service provided to the Redmond Ridge/Trilogy developments. The one route that does serve the area (Route 929) travels between Redmond and North Bend three times a day (one morning, one mid-day and one evening route in each direction).

As a condition of development approval, the developer was required to provide internal transit service upon the occupancy of the 500th dwelling unit. When transit service does begin for the Redmond Ridge/Trilogy developments, it will most likely be split into internal service provided by the developers and external service provided by King County Metro. The internal service will begin as an on-call service provided between established hours of operation. As ridership increases, the service could go to a fixed route and schedule.

There is currently no funding available for King County Metro to provide an external transit route serving the Redmond Ridge/Trilogy developments. The Redmond Ridge/Trilogy developers hope that when they begin their shuttle service, then King County Metro will alter their route to serve the Park and Ride lot on the development to facilitate transfers from the internal shuttle service.

1.5.2 Forecast Transit Service for 2030

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. Table 1-1 lists the number of routes by type (rail, ferry, high frequency bus service, and low frequency bus service), while Table 1-2 lists the frequency of service for each transit type.

The transit forecast is expected to increase slightly with one more bus per hour in the AM peak.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				1	**1**
	2030				1	**1**
Mid-Day	2000				1	**1**
	2030				1	**1**

Table 1-2. Frequency of Service (buses per hour)

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				1	**1**
	2030				2	**2**
Mid-Day	2000				0	**0**
	2030				2	**2**

1.6 Parking Supply, Availability and Price

As the level of development is still relatively minimal, no survey of parking was completed. The future parking supply is based on existing zoning regulations.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2001 Supply	Parking was not surveyed			
2001 Demand				
2001 D/S Ratio				
2030 Supply				**3,303**
2030 Demand				**2,317**
2030 D/S Ratio				**0.70**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. Due to the nature of the area (Rural) the model predicts that free parking will continue into the future, as illustrated in Table 1-4.

Table 1-4. Average Parking Costs

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$0.00
Carpool	$0.00	$0.00
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

Despite the fact that the Redmond Ridge/Trilogy developments are being built to be pedestrian and bicyclist-friendly, there are few opportunities for residents to use non-motorized transportation for purposes other than recreation. Although there is an extensive trail network, and a complete sidewalk network exists, trail access to destinations outside of the development will probably be limited, and within the development, distances between destinations are, in most cases, greater than most people would be willing to walk. Residents of the Trilogy (55+) development, on the north side of Novelty Hill Road, would have to cross that 4-lane road in order to get to any of the commercial or employment areas located in Redmond Ridge.

2.0 Population and Employment Characteristics

Population and employment data for the Redmond Ridge area are discussed below.

2.1 Population

The size and population for both 2000 and 2030 of the case study area is given in Table 2-1. The population is expected to increase tremendously (over 10 times) over the next thirty years. Almost all of this growth is expected to occur at the two developments.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	4.45	
Population	852	2,651

2.2 Employment

The number of employees in the study area as of 2000 was extremely low (5 employees). This number is expected to increase to 4200 employees in the future with the employees fairly well distributed between large and small employers (See Table 2-2 and Table 2-3).

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	0	450
Office	0	3,750
Other	5	0
Total	**5**	**4,200**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	0	5	0	0	5
2030	1,450	601	1,001	1,148	4,200

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table 2-5 illustrates the land use characterizations for the Redmond Ridge area. The transit service is forecast to remain very low. The only characteristic that is expected to change is that the mixed-use for one zone is expected to go from low to medium. Table 2-6 gives the population, employment and trips by local area TAZ for the Redmond Ridge area. The summary of these characteristics was described in earlier sections. The PSRC/Trans-Lake model does not forecast much growth in transit service to the Redmond Ridge area as illustrated in Table 2-7.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations by Local Area TAZ

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
438	Low 2	Low 2	Low	Medium	Low	Low
440	Low 2	Low 2	Low	Low	Low	Low

Table 2-6. Population, Employment and Trips by Local Area TAZ

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail		Other		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
438	2.590	310	1,882	0	225	5	1,875	750	2,126	266	541
440	1.857	542	769	0	225	0	1,875	506	781	242	342

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	0	0	0	0	2	2
	2030 Base	0	0	0	0	0	2	2
Population	2000 Base	0	0	0	0	0	852	852
	2030 Base	0	0	0	0	0	2,651	2,651
Total Employment	2000 Base	0	0	0	0	0	5	5
	2030 Base	0	0	0	0	0	4,200	4,200

3.0 Travel Behavior Inventory

3.1 Person and Vehicle Trips

The person and vehicle trips for study area employees and residents are illustrated in Table 3-1. The tremendous growth expected in the Redmond Ridge area over the next thirty years translates into nearly ten times an many vehicle trips for both study area employees and employed residents.

Table 3-1. Daily Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	508	883	480	765
Employed Residents	1,256	2,907	1,131	2,219

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work by Redmond Ridge employees was estimated based on the distance that employees located at similar locations traveled. These values are illustrated in Table 3-2.

Table 3-2. Average Vehicle Miles Traveled to Work by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	19
Vanpool	25
Transit	18
Non-Motorized	0

3.3 SR 520 Corridor Trips

About 5.3 percent of the PM Peak vehicle trips to and from Redmond Ridge cross the SR 520 bridge. As shown in Table 3-3, both a higher percentage and a higher number of vehicle trips entering the Redmond Ridge use the bridge, although trips leaving the study area contribute a higher total number of vehicles (i.e. over 3,300) to the bridge traffic. At 1,349, Redmond Ridge trips comprise 3.3 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	10,744	14,927	25,671
Study Area Trips Crossing SR 520 Bridge	540	809	1,349
Percent of Case Study Trips Crossing SR 520 Bridge	5.0%	5.4%	5.3%

3.4 Average Vehicle Occupancy for Commute trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Average Number of People per Vehicle

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

There are no CTR employers in Redmond Ridge, so no historical mode share information is available.

4.0 History with TDM and Land Use Strategies

There are no CTR employers in Redmond Ridge, so no historical mode share information is available. However, the developer of the Trilogy/Redmond Ridge development has a formal agreement with the County to institute a Transportation Demand Management Program. Details regarding the program are listed below:

1. Distribute site-appropriate transit and rideshare information to new tenants/residents and annually to all tenants/residents. (Distribution many be incorporated into a community newsletter or other medium that will be distributed throughout the development.)
2. Distribute site-appropriate transit and ridesharing information to purchasers of new homes.
3. Display site-appropriate transit and ridesharing information in prominent public locations.
4. Design and implement a parking management program, which may include, among other elements, preferential parking for high occupancy vehicles, combining the retail/commercial and business park areas of the Northridge development.
5. Provide a free one-month bus pass to new employees and residents who request them. The one-month free bus passes will be available at the time of hiring or occupancy.
6. Design and implement a Transportation Demand Management program for the business park that sets forth actions for ridesharing, flextime, walking, bicycling, telecommuting, marketing, and other activities to reduce peak hour travel by single-occupant vehicles (SOV). The program may include financial subsidies for non-SOV travel consistent with program for other business parks in comparable market areas of King County. The program will be developed and funding through the business park owners' association in coordination with King County. The initial program will be developed prior to the first certificate of occupancy for the business park. The program will be reviewed and updated as the business park is built out.
7. Design and implement or purchase publicly available guaranteed ride home program for business park users.
8. Implementation of other measures likely to reduce drive alone trips associates with the Northridge development.

This program has been in development since 1997 and has gone through a number of revisions. Most recently, the developers of Redmond Ridge put together the Second Annual Update to their Transit Plan, which discussed the activities of the shuttle that the development has agreed to provide.